GA21-9369-2

# IBM 5294 Control Unit

## Setup Procedure

IBM

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## Setup Procedure

File Number
S5250/S38/S36-00

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**Third Edition (March 1987)**

This is a major revision of, and makes obsolete, GA21-9369-1 and Technical Newsletters GN21-0404 and GN27-3353. Information about the IBM Enhanced Keyboard has been added. Changes are periodically made to the information herein; any such changes will be reported in subsequent revisions or Technical Newsletters.

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# Contents

# About This Manual

## Purpose of this manual . . .

This manual describes the setup procedure for the IBM 5294 Control Unit. By using this procedure, you will be able to set up and check out your work station controller. No special tools or skills are required. This procedure should be used after your work station controller has been unpacked and located where you intend to use it or whenever the controller is disconnected and relocated.

## Organization of this manual . . .

This manual is divided into four chapters and three appendixes:

Chapter 1 lists what must be done before setup.

Chapter 2 describes the setup of the 5294 and how to attach the work stations.

Chapter 3 describes how to enter information on the customer setup display.

Chapter 4 describes how to connect the communications line to the system.

Appendix A contains a blank *IBM 5294 Setup Form*.

Appendix B contains a Problem Checklist and the Customer Setup Error Codes.

Appendix C shows the location of the Terminator switch on the work stations.

# If you need more information . . .

You may wish to refer to one of the following publications:

*IBM 5250 Information Display System Introduction*, GA21-9246, describes the work stations that make up the 5250 and their available functions and features.

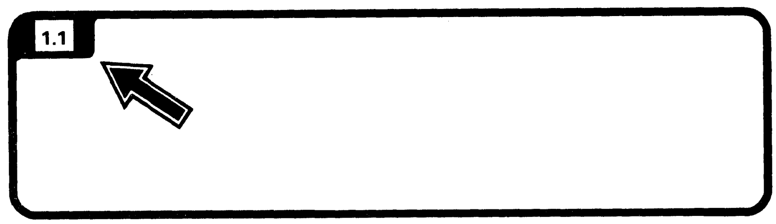
*IBM 5250 Information Display System Planning and Site Preparation Guide*, GA21-9337, provides environment, electrical, communications, space, furniture, and cable specifications for planning the installation of the IBM 5250 Information Display System. This manual also provides information to help the system programmer configure the system and prepare instructions for setup personnel at remote sites.

*IBM 5294 Control Unit Operator's Guide and Operating Procedures*, GA21-9370, describes the procedures required to operate the 5294 from a display station and describes how to correct problems when the controller does not operate as expected.

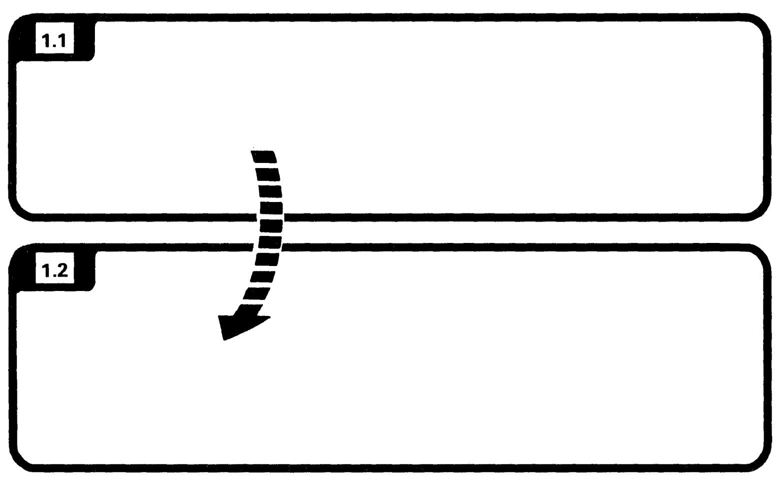
*IBM Multistation 5550 Chinese 5250 Personal Computer User's Guide* (Taiwan and Hong Kong, 5600-485; People's Republic of China, 5600-490) or the *IBM Multistation 5550 Hangeul 5250 Personal Computer User's Guide*, 5600-480, provides operator information about the 5550 system when it is used as a work station.

# How to use this manual . . .

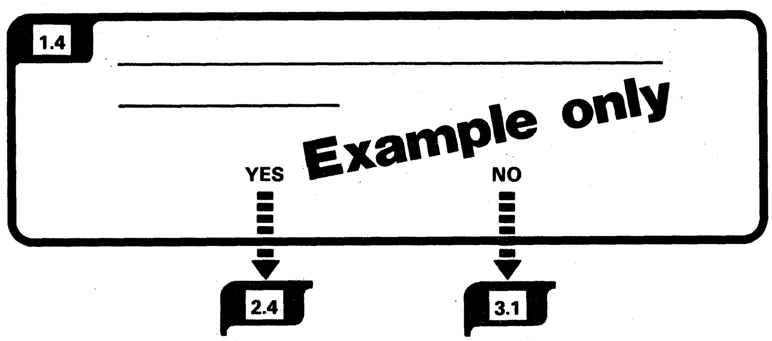
Each step that you perform is identified with two numbers. The first number identifies the chapter and the second number identifies the step within that chapter.



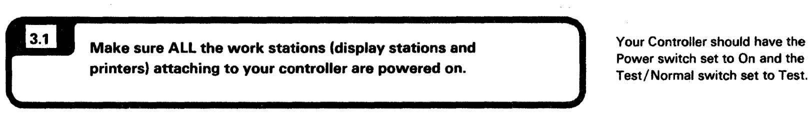

When you complete a step, go to the next step.

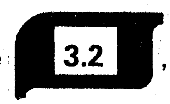


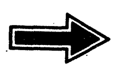
Some steps will ask you questions. Depending on how you answer the question, you might not always go to the next step.



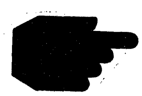

Words and art that appear to the right of each step are additional information you might need to complete the task. Always read the information in the step first and then the additional information.




A symbol that appears in the text, like , means go to that step. (This means go to Chapter 3, Step 2.)


An arrow, like , is used to point out or locate something on the art.

A broken arrow, like , is used to show action such as push, pull, turn, go to, and so on.

A small hand, like , is used to show location and pressing action.

**Note:** To avoid problems during setup, you should follow the instructions in this manual step-by-step. If you encounter a problem, instructions to the right of the steps tell you what to do.

# Chapter 1. What Should Be Done Before Setup

Contact your system operator and make sure that the preparations for attaching your controller have been completed.

**1.1**

### Setup Checklist

Before you begin to set up the 5294 Control Unit, answer the following questions. If the answer to any of the questions is no, or if you are unsure, contact the person who planned the setup. You may check the box ☑ as you complete each step.

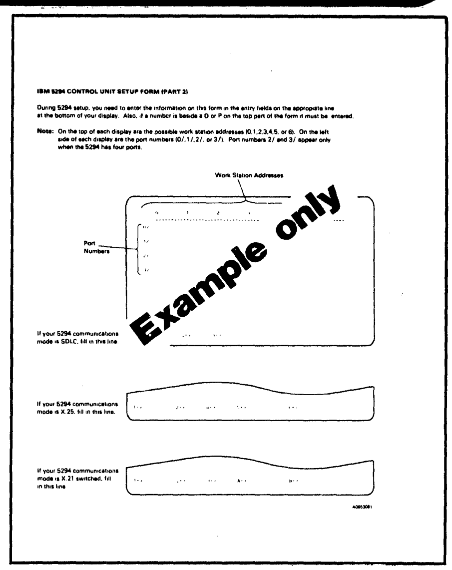
**1.2**

- ☐ **Has the communications equipment for establishing communications with your system been installed?**
- ☐ **Has your system been prepared to accept the 5294 Control Unit?**

**1.3**

- ☐ **Do you have a filled in copy of the *IBM 5294 Setup Form* (see Appendix A for a sample form)?**

The *IBM 5294 Setup Form* should have been filled out by your planner and given to you. If you do not have a filled in copy, instructions for filling it out are in the *IBM 5250 Information Display System Planning and Site Preparation Guide*.


IBM 5294 CONTROL UNIT SETUP FORM (PART 2)

During 5294 setup, you need to enter the information on this form in the entry fields on the appropriate line at the bottom of your display. Also, if a number is beside a D or P on the top part of the form it must be entered.

Note: On the top of each display are the possible work station addresses (0,1,2,3,4,5, or 6). On the left side of each display are the port numbers (0/,1/,2/, or 3/). Port numbers 2/ and 3/ appear only when the 5294 has four ports.

Work Station Addresses

Port Numbers

If your 5294 communications mode is SDLC, fill in this line.

If your 5294 communications mode is X.25, fill in this line.

If your 5294 communications mode is X.21 switched, fill in this line.

## Safety Precaution

The power cord and plug (when supplied) on your controller has been approved for use with this controller and meets the necessary testing laboratory/test house standards. For your safety, the power cord and plug must be connected to a properly wired and grounded outlet. An improperly wired outlet or plug can place hazardous voltages on accessible metal parts of this controller. The customer is responsible for the outlet and the plug wiring.

If it becomes necessary to change the power cord or plug or if the outlet is improperly wired, have the change made according to local or national code. A new power cord may be ordered from your IBM sales representative.

The term *work station* refers to a display station or a printer.

**1.4**

☐ **Are properly wired and grounded electrical outlets installed?**

**1.5**

☐ **Is the end of each work station cable that will attach to the 5294 Control Unit labeled?**

**1.6**

☐ **Are all the work stations (display stations and printers) that will attach to the 5294 Control Unit set up and cabled?**

**YES** → Chapter 2

**NO** → **1.7**

Unpacking instructions come with each display station and printer.

The manual is packed inside the carton on top of the display station or printer.

**1.7**

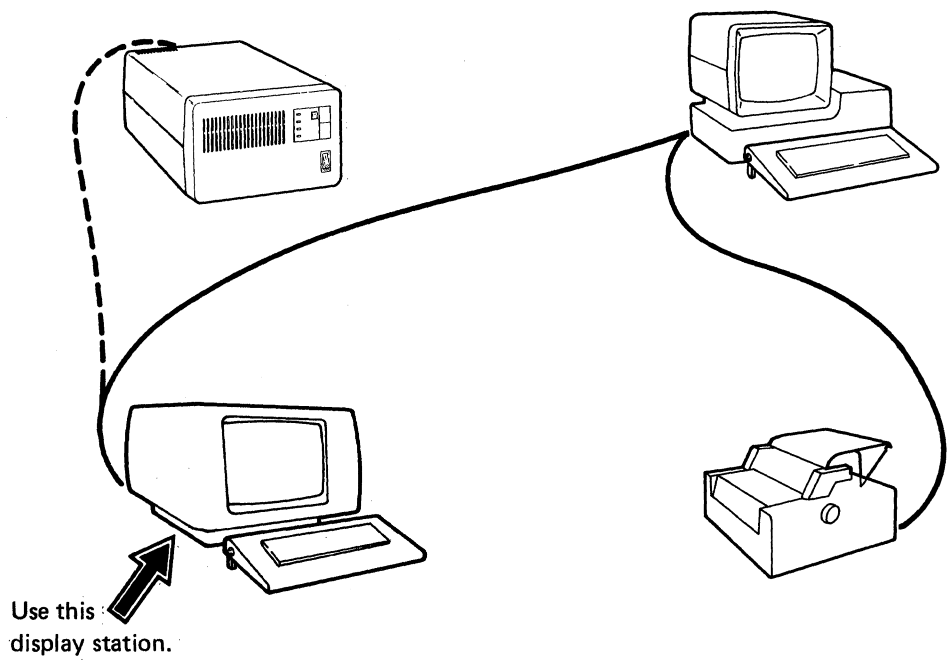
- Unpack the display stations and printers and place them where they will be used.
- To set up a display station or printer, use the setup manual for that device.

  **Note:** When you set up a display station, STOP when you get to the final Display Station Checkout. The System Available indicator will *not* appear on the display until later in the 5294 setup.

- After you have set up all of your display stations and printers, return to Chapter 2 in this manual.

# Chapter 2. Setup and Work Station Attachment

For this setup procedure, you will need to use one of the display stations that you are attaching to the 5294. Use the display station that is closest and most convenient.



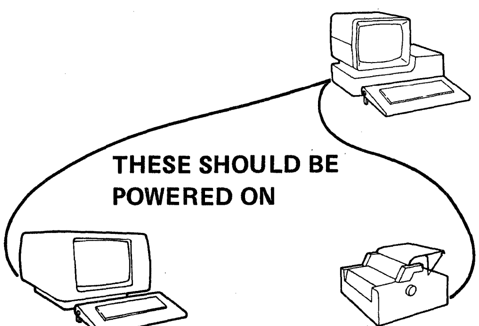

**Example only**

Have you completed the *Setup Checklist* in Chapter 1?

# Attaching the Power Cord

**2.1**

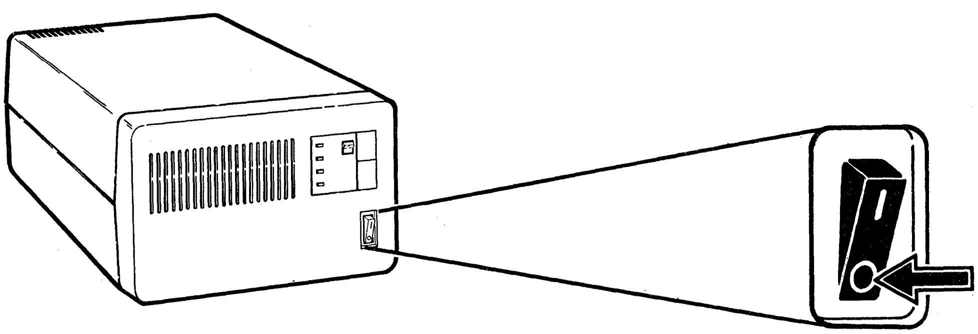
**Set the Power switch on *all* the work stations (display stations and printers) to On.**



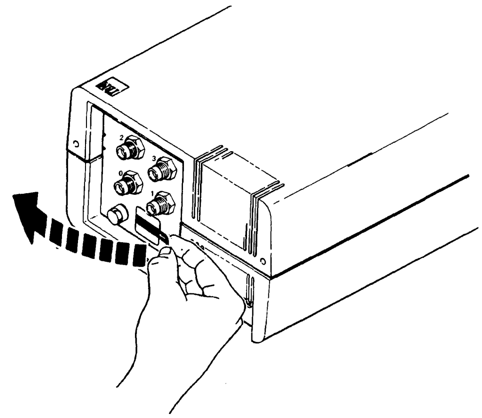

**Example only**

**2.2**

**Set the 5294 Power switch to Off.**



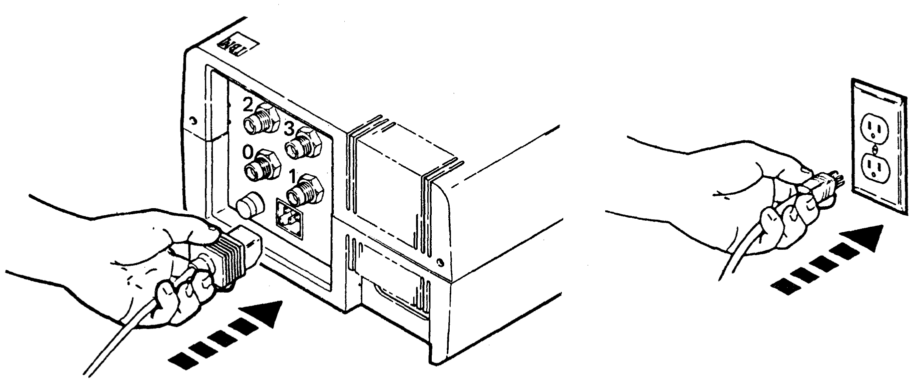
**2.3** **Remove the plastic covering from the power cord connection on the back of the controller (as shown).**



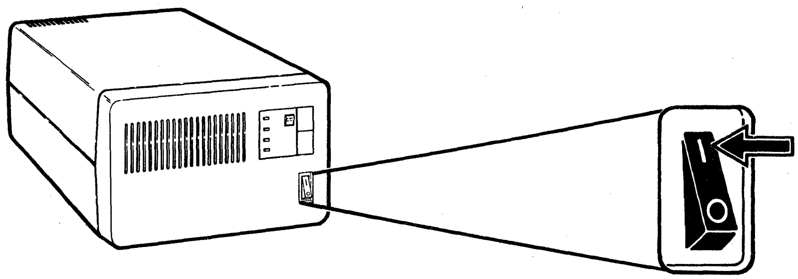
## Safety Precaution

Do not connect or disconnect a power cord during an electrical storm. You could be seriously injured.

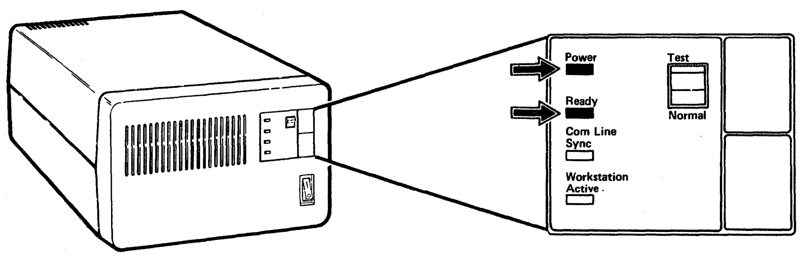
**2.4** **Plug the power cord into the power cord connection on the back of the controller. Plug the other end of the power cord into the grounded electrical outlet.**



**2.5** Set the 5294 Power switch to On.



**2.6** All indicators go on for about 1 second; then, all indicators except the Power indicator go off. After a few seconds, the Ready indicator should come on.




**Are the Power and Ready indicators on?**

**YES** → **2.7**

**NO** →

If the Power indicator is not on, make sure the power cord is connected properly at both ends. Also make sure there is power to the outlet. If the indicator is still not on, contact your service representative.

If the Power indicator is on and the Ready indicator is not on, contact your service representative.

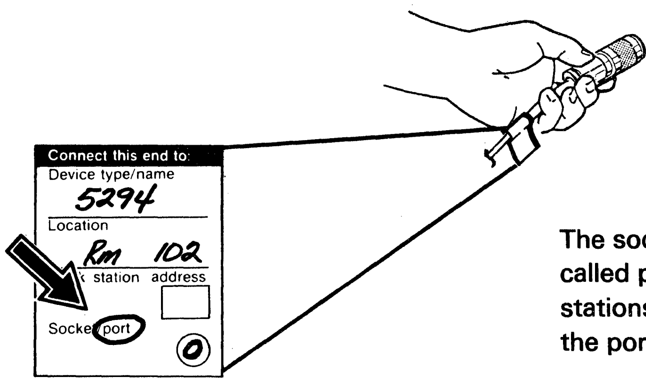
# Connecting the Cables

## Safety Precaution

Do not connect or disconnect a cable during an electrical storm. You could be seriously injured.

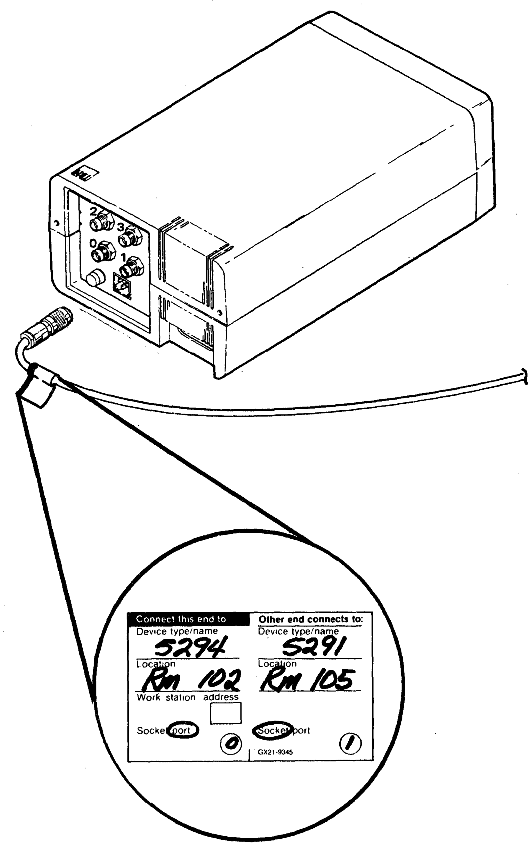
**2.7** **Set the 5294 Power switch to Off.**

**2.8** **Find the work station cable that connects to port 0 on the controller.**



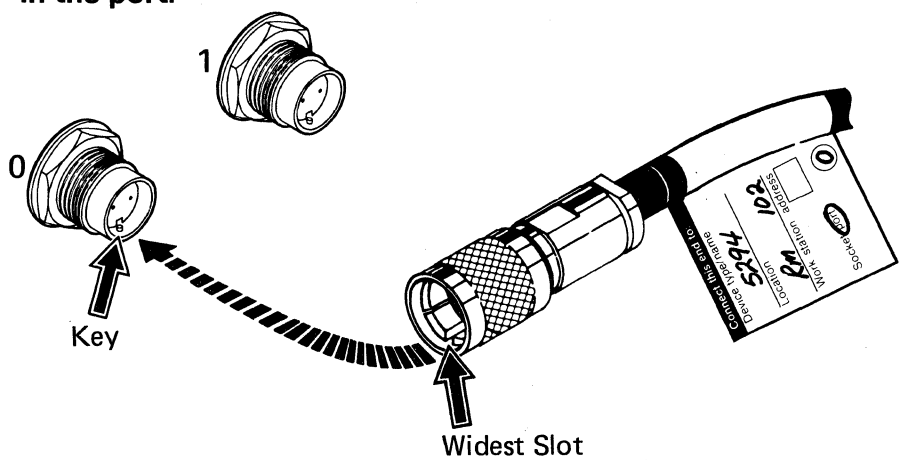

The sockets on the 5294 are called ports. Sockets on the work stations are exactly the same as the ports on the controller.

Make sure the cable(s) that will be connected to your controller are labeled. If they are not, information on labeling cables is in the *IBM 5250 Information Display System Planning and Site Preparation Guide*.

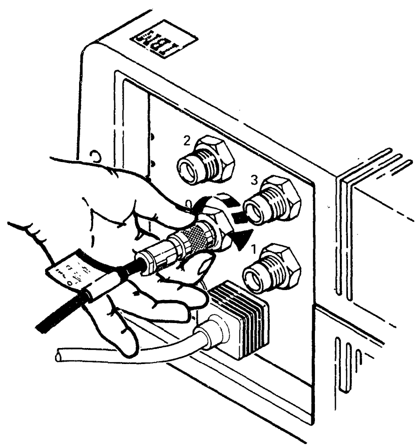


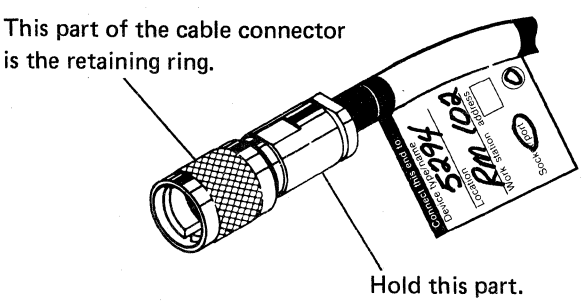
Your controller may have two or four ports.

**2.9** **Align the widest slot in the cable connector with the key in the port.**




**2.10** **Push the connector in and turn the retaining ring clockwise until tight.**

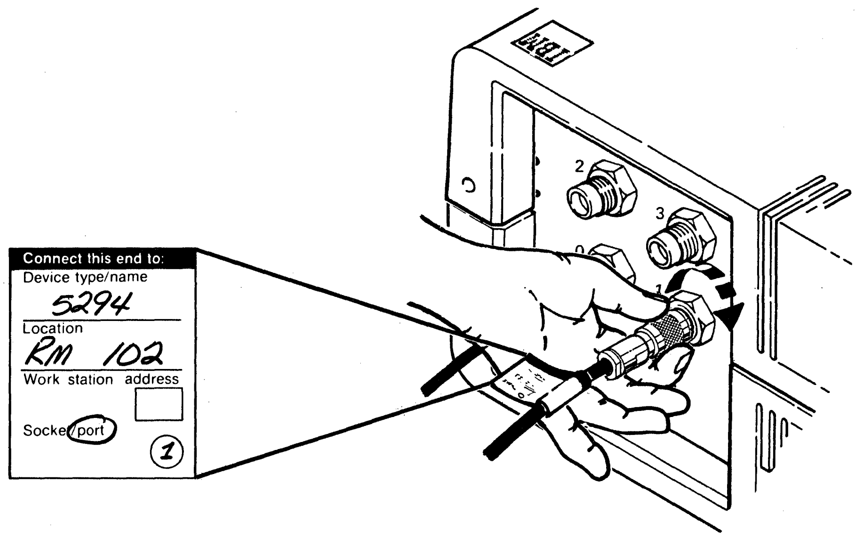




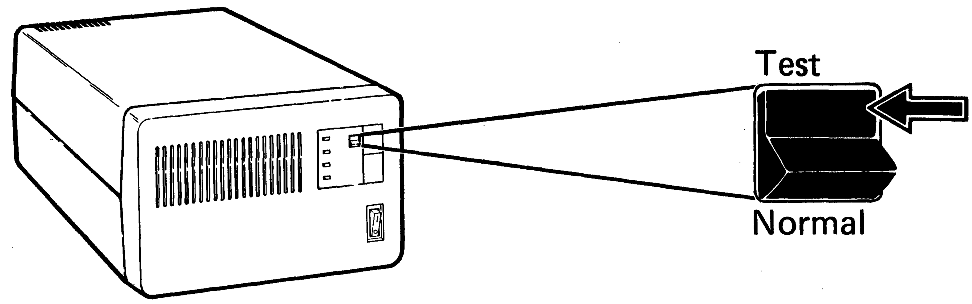
You may be attaching up to four cables to your 5294.

**2.11**

**If there are work station cables to connect to port 1, port 2, and/or port 3, continue connecting them until *all* of the cables are connected.**

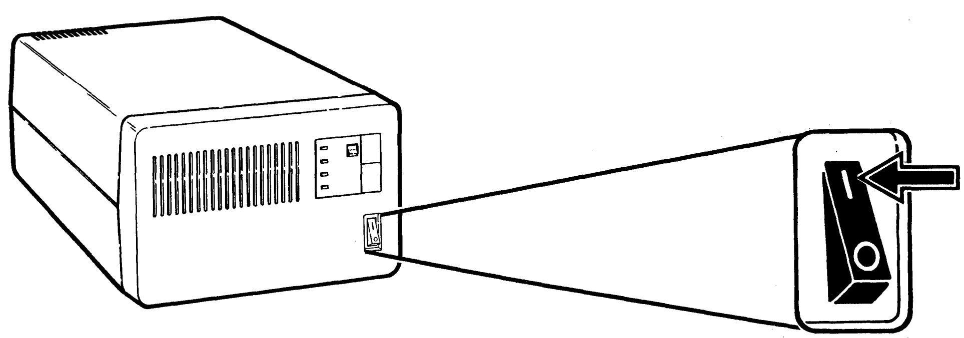


**2.12** **Set the Test/Normal switch to Test.**




Make sure that the work stations being connected to your controller are cabled and powered on.

**2.13** **Set the 5294 Power switch to On.**

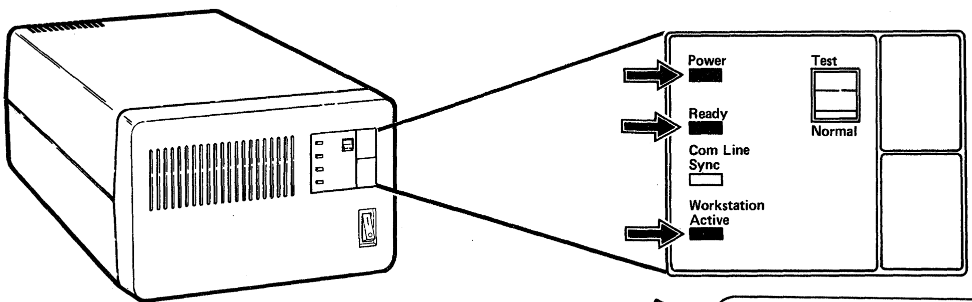


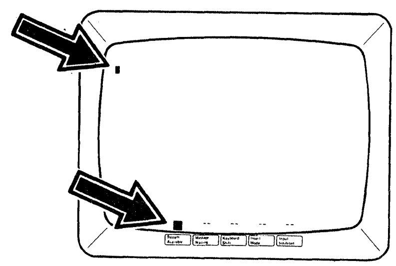
For convenience, check for the cursor and System Available indicator on the display station closest to your controller.

The System Available indicator may appear in different positions, depending on the type of display station.

## 2.14

The Power indicator comes on immediately, followed by the Ready and Workstation Active indicators.



Also, the Cursor (in the upper left corner) and the System Available indicator should appear on the display station(s) that you are attaching to your controller.

**Do these indicators on the 5294 Control Unit and the display station(s) come on?**

**YES** — Chapter 3

**NO** — If the indicators on the controller or the display do not appear, there is a problem with either the cables or the attached work stations.
Make sure the cables are connected properly and are tightened, then check that the terminator switches are set correctly.
If the indicators still do not appear, contact the person who planned the setup.

# Chapter 3. Setup Display Configuration

## Before you Start the Configuration

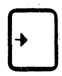
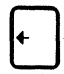
In this chapter, you will be given the instructions for entering specific information at one of the attaching display stations.

Following are some important points that will help you complete the setup display configuration. Be sure you read through each point carefully before you continue.

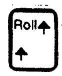
- Make sure you have a filled in copy of the *IBM 5294 Setup Form* (see Appendix A for a sample form).

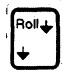
The information on the *IBM 5294 Setup Form* will be entered at the display station.

- You will need to use some specific keys to enter the information in the entry fields of your display. The following gives the function of these keys in this mode:

  – Cursor Right  and Cursor Left  keys:

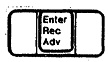
    The Cursor Right key moves the cursor one entry field or one character to the right; the Cursor Left key moves the cursor one entry field or one character to the left.

  – Cursor Up 

and Cursor Down 

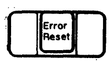
keys:

    The Cursor Up key increases the value of the entry field where the cursor is located by one each time it is pressed. The Cursor Down key decreases the value of the entry field where the cursor is located by one each time it is pressed.

  – Enter key 

:

    The Enter key, when pressed TWICE, stores the information in the entry fields.

  – Reset key 

:

    The Reset key resets the display and/or terminates the customer setup display. The Reset key must be pressed before any corrections can be made if an error occurred during the setup display configuration.

These keys are in different positions on different keyboards.

The Cursor Up and Cursor Down keys are typematic keys. When they are held down, the value in the entry field where the cursor is located continues to increase or decrease until the key is released.

- If a blinking four-digit error code appears in the lower left corner of the display screen while you are performing this procedure, refer to Appendix B, *Problem Checklist and Customer Setup Error Codes* for an explanation and recovery procedure.

- If a blinking four- or six-digit error code appears in the upper left corner of the display, refer to Chapter 3 in the *IBM 5294 Control Unit Operator's Guide and Operating Procedures* for an explanation and recovery procedure.

# Setting the Display

Your controller should have the Power switch set to On and the Test/Normal switch set to Test.

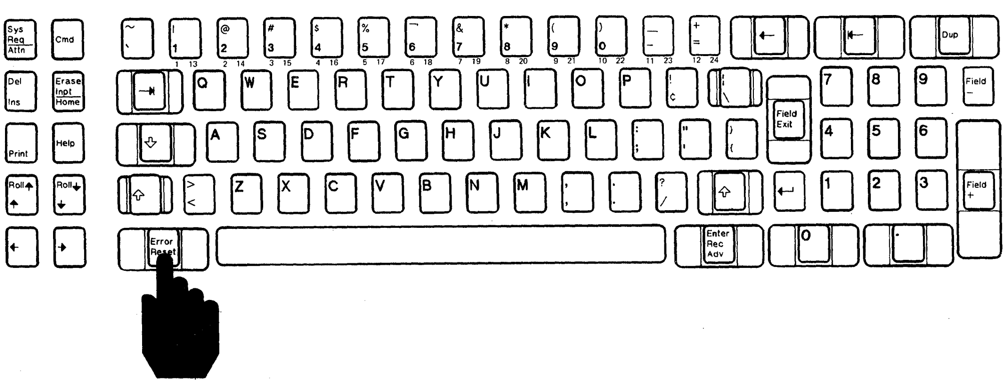
ALL THE WORK STATIONS (DISPLAY STATIONS AND PRINTERS) MUST BE POWERED ON DURING THIS PROCEDURE. The 5294 will not recognize any work stations that are not powered on.

**Note:** Refer to the IBM Multistation 5550-5250 Personal Computer User's Guide for the key location.

**3.1** **Make sure ALL the work stations (display stations and printers) attaching to your controller are powered on.**

**3.2** **Go to the display station closest to the controller.**

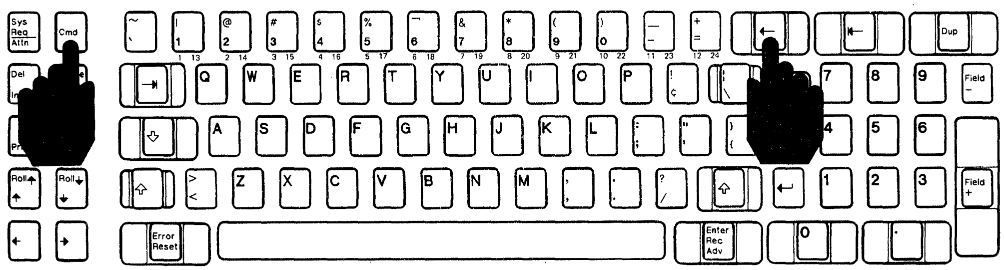
**3.3** **Press the Error Reset [Error Reset] key and continue to step 3.4.**



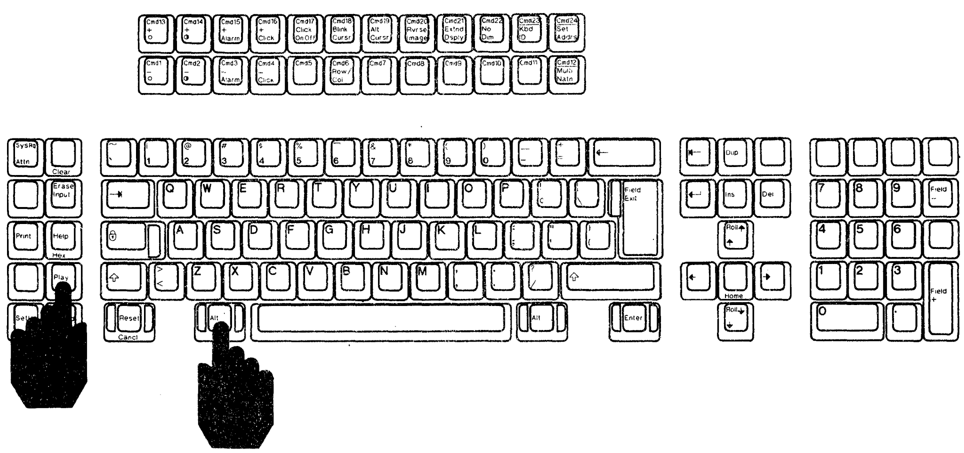
You only need to perform this procedure on one of the display stations.

**3.4**

If the display station is a 5292 Model 1 or Model 2, a 5291, or a 5251 Model 11, press the Command Cmd key; then press the ← (see illustration below) key on the display station keyboard.



If the display station is a 3179 Model 2, a 3180 Model 2, or a 3196 without the Enhanced Keyboard, press and hold the Alt Alt key; then press the Test Play Test key.

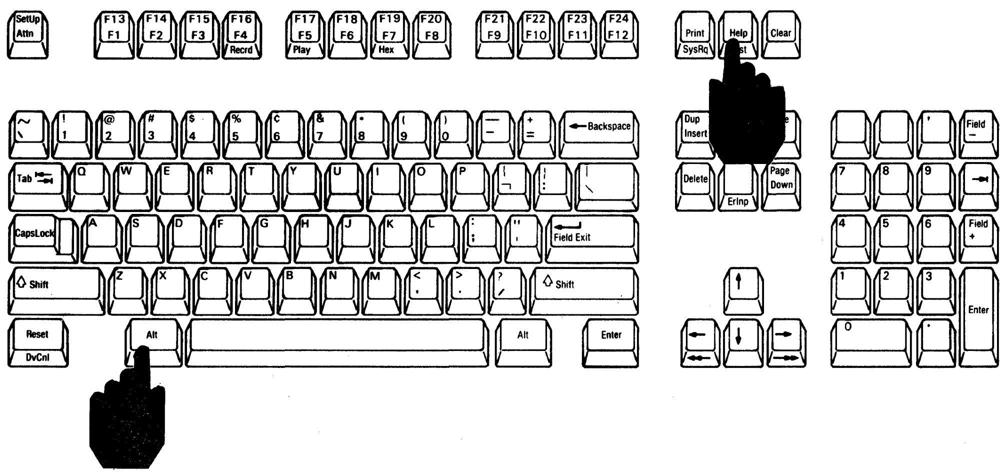


**Frame 3.4 Continued**

If an error code appears in the upper left corner of the display after you press these keys, press the Reset key and repeat Step 3.4.

3.4 (cont'd)

If the display station has an IBM Enhanced Keyboard, press and hold the Alt key; then press the Test key.



If an error code appears in the upper left corner of the display after you press these keys, press the Reset key and repeat Step 3.4.

**Note:** Field one = 00 for all displays attached to the 5294 Model S01.

If you attach your controller to an SDLC network, entry fields 1->, 2->, and 3-> appear at the bottom of your display.

If you attach your controller to an X.25 network, entry fields 1->, 2->, 4->, 5->, and 6-> appear at the bottom of your display.

If you attach your controller to an X.21 switched network, entry fields 1->, 2->, 9->, A->, and B-> appear at the bottom of your display.

**3.5**

The following setup display should appear. (The arrangement of Ds and Ps and the positions of the entry fields of your display might not look exactly like the following example.)

```
          0         1         2         3         4         5         6
          ---------------------------------------------------------------
     0/   D         .         .         .         .         P         .

     1/   D         .         .         .         .         .         .

     2/   D         .         .         .         .         .         .

     3/   D         .         .         .         .         .         .



 1-> 00         2-> 01         3-> 0010001000
```

**Does the setup display appear?**

**YES** → **3.6**

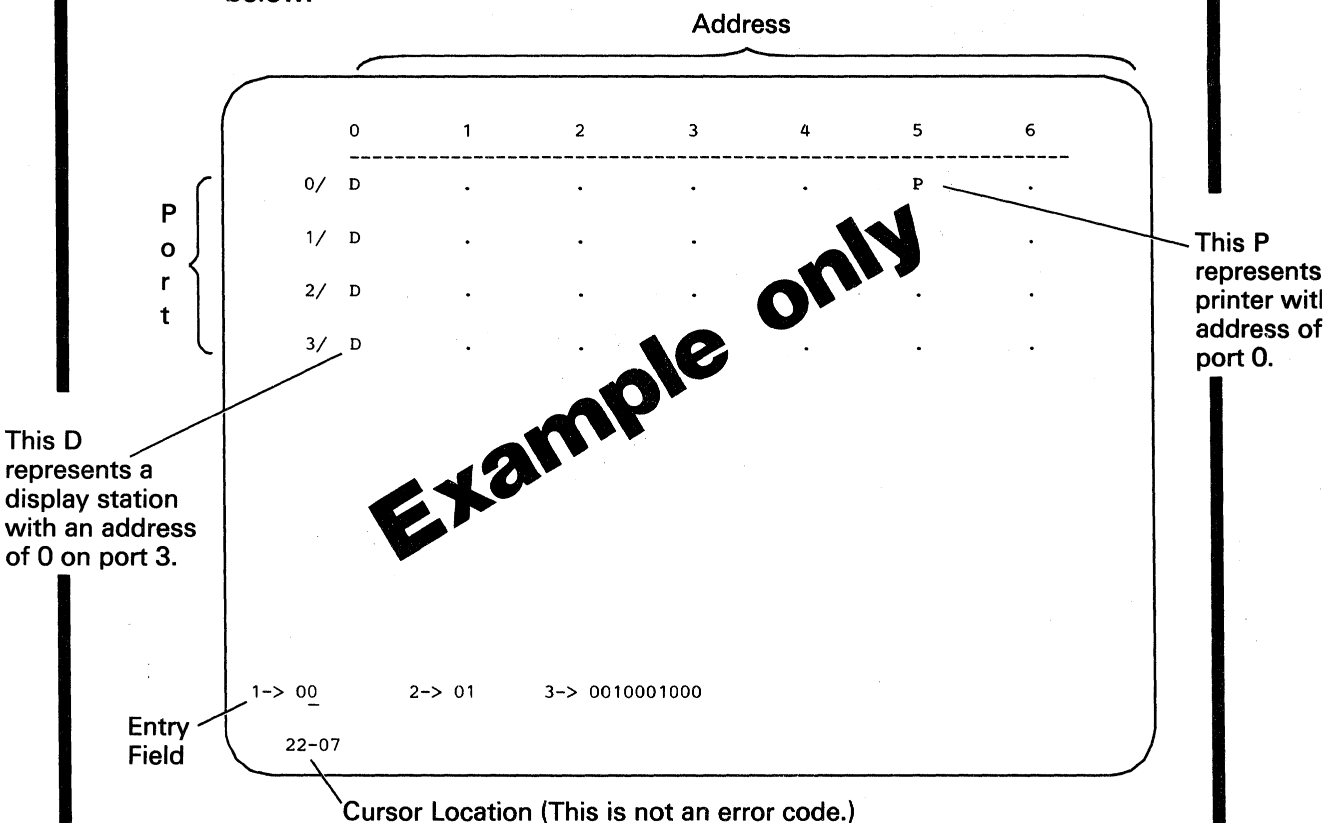
**NO** → If the setup display does not appear, set the 5294 Power switch to Off and repeat steps 2.12 through 3.4. If it still does not appear, contact your service representative.

An E on your display represents an extra work station. If there are any Es on your display, the extra work stations must be removed. Contact the person who planned the setup if you need assistance.

There may be additional two-digit codes beside some of the Ds on the display. These codes will be entered on your display later in this chapter.

**3.6**

An explanation of the setup display is provided in the example below.




Study the above example before you continue.

If you attach your controller to an SDLC network, the top layout display on the setup form should be filled in.

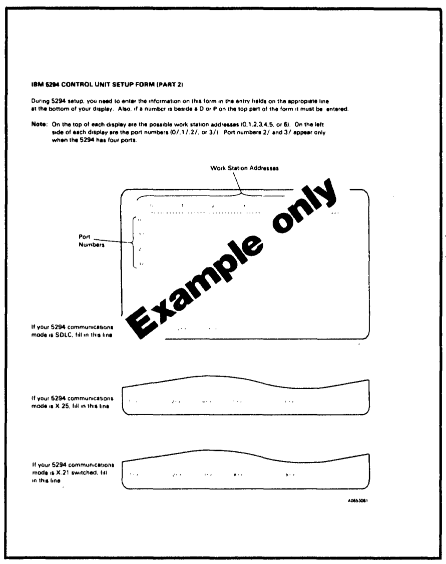
If you attach your controller to an X.25 network, the middle layout display on the setup form should be filled in.

If you attach your controller to an X.21 switched network, the bottom layout display on the setup form should be filled in.

**3.7**

Refer to Part 2 of the *IBM 5294 Setup Form* (Appendix A). Locate the layout display on that form that was filled in by the person who planned the setup.

Compare the arrangement of Ds and Ps on your display with those filled in on the layout display.




SDLC

X.25

X.21

One of these layout displays should be filled in, too.

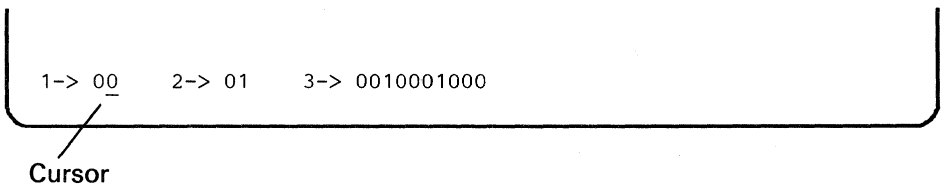
**Does the arrangement of Ds and Ps match?**

**YES** → **3.8**

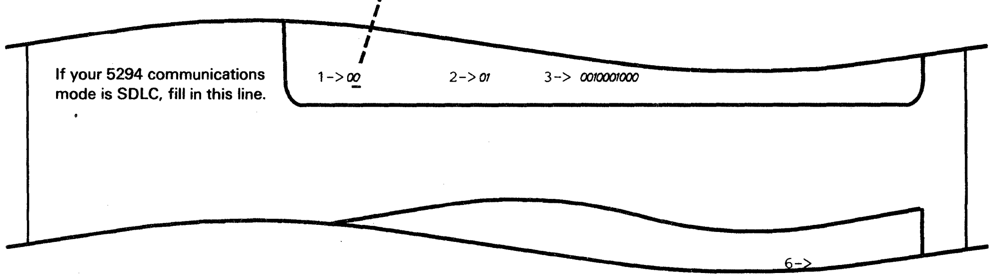
**NO** → Appendix B

The cursor will automatically be under the second position of field 1->.

**3.8** **Locate the cursor on your display.**




**3.9** **Find the number that is filled in beside field 1 -> on the *IBM 5294 Setup Form*.**



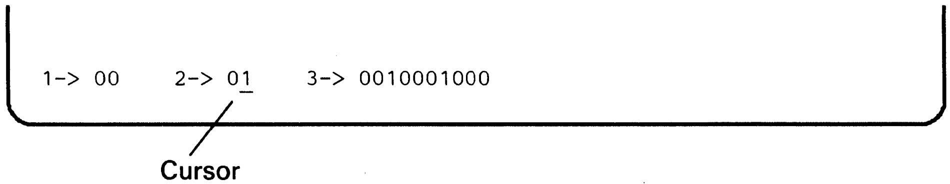

**Note:** This field will not change from 00 for US units.

The Cursor Up and Cursor Down keys are typematic keys. If they are held down, the value in the entry field continues to increase or decrease until the key is released.

**3.10** **Press the Cursor Up** Roll↑ ↑ **key to increase the value or the Cursor Down** Roll↓ ↓ **key to decrease the value in field 1 ->. Continue pressing the key until the number that is filled in on the *IBM 5294 Setup Form* appears in field 1 ->.**

**3.11**

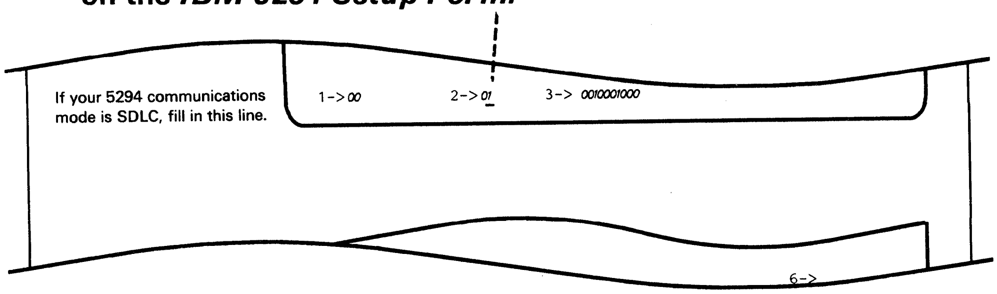
**Press the Cursor Right [→] key to move to field 2 ->.**




One or both of the characters to be filled in beside field 2-> may be letters instead of numbers.

**3.12**

**Find the two-character code that is filled in beside field 2 -> on the *IBM 5294 Setup Form*.**




Depending on how long you press the Cursor key, one or both values in the field will change. Continue to press the key until both values match the values on your form.

**3.13**

**Press the Cursor Up [Roll↑] key to increase the value or the Cursor Down [Roll↓] key to decrease the value in field 2 ->.**

**Continue pressing the key until the two-character code that is filled in on the *IBM 5294 Setup Form* appears in field 2 ->.**

**3.14**

If the next field on your display is 3 ->, go to step **3.15**.

If the next field on your display is 4 ->, go to step **3.19**.

If the next field on your display is 9 ->, go to step **3.30a**.

**3.15**

**Press the Cursor Right key to move to field 3 ->.**

```
1-> 00     2-> 01     3-> 0010001000
```

Cursor

**3.16**

**Press the Cursor Up or Cursor Down key to get the correct digit (0 or 1) in the first position (refer to the *IBM 5294 Setup Form*).**

**3.17**

**Press the Cursor Right key to move to the next position in field 3 ->.**

```
1-> 00     2-> 01     3-> 0010001000
```

Cursor

**3.18**

Fill in the correct digit for that position. Repeat this procedure until all ten positions match the information that is filled in on the form.

Go to step **3.31**.

**3.19**

Press the Cursor Right key to move to field 4 ->.

```
1-> 00     2-> 01     4-> 027     5-> 1 000 000     6-> 00000000
```

(Cursor under the first digit of field 4 ->)

**3.20**

Press the Cursor Up or Cursor Down key to get the correct digit in the first position (refer to the *IBM 5294 Setup Form).*

**3.21**

Press the Cursor Right key to move to the next position in field 4 ->.

```
1-> 00     2-> 01     4-> 027     5-> 1 000 000     6-> 00000000
```

(Cursor under the second digit of field 4 ->)

**3.22**

Fill in the correct digit for that position. Repeat this procedure until all three positions match the information that is filled in on the form.

**3.23**

**Press the Cursor Right key to move to field 5 ->.**

```
1-> 00     2-> 01     4-> 027     5-> 1 000 000     6-> 00000000
```

Cursor

**3.24**

**Press the Cursor Up or Cursor Down key to get the correct digit in the first position (refer to the *IBM 5294 Setup Form).***

**3.25**

**Press the Cursor Right key to move to the next position in field 5 ->.**

```
1-> 00     2-> 01     4-> 027     5-> 1 000 000     6-> 00000000
```

Cursor

**3.26**

**Fill in the correct digit for that position. Repeat this procedure until all seven positions match the information that is filled in on the form.**

**3.27**

**Press the Cursor Right key to move to field 6 ->.**

```
1-> 00     2-> 01     4-> 027     5-> 1 000 000     6-> 00000000
```

Cursor

**3.28**

Press the Cursor Up or Cursor Down key to get the correct digit (0 or 1) in the first position (refer to the *IBM 5294 Setup Form).*

**3.29**

Press the Cursor Right key to move to the next position in field 6 ->.

```
1-> 00     2-> 01     4-> 027     5-> 1 000 000     6-> 00000000
```

Cursor

**3.30**

Fill in the correct digit for that position. Repeat this procedure until all eight positions match the information that is filled in on the form.

Then, go to step **3.31**.

**3.30a**

Press the Cursor Right key to move to field 9 ->.

```
1-> 00     2-> 01     9-> 0     A-> AAAAAAAAAAAAAAA     B-> 00 0 0
```

Cursor

**3.30b**

Press the Cursor Up or Cursor Down key to get the correct digit in the entry field (refer to the *IBM 5294 Setup Form).*

Make sure this digit matches the digit that is filled in on the form.

**3.30c**

**Press the Cursor Right key to move to field A ->.**

```
1-> 00    2-> 01    9-> 0    A-> AAAAAAAAAAAAAAA    B-> 00 0 0
```

Cursor

**3.30d**

**Press the Cursor Up or Cursor Down key to get the correct digit (0 through A) in the first position (refer to the *IBM 5294 Setup Form).***

**3.30e**

**Press the Cursor Right key to move to the next position in field A ->.**

```
1-> 00    2-> 01    4-> 027    A-> AAAAAAAAAAAAAAA    B-> 00 0 0
```

Cursor

**3.30f**

**Fill in the correct digit for that position. Repeat this procedure until all fifteen positions match the information that is filled in on the form.**

**3.30g**

**Press the Cursor Right key to move to field B ->.**

```
1-> 00    2-> 01    4-> 027    A-> AAAAAAAAAAAAAAA    B-> 00 0 0
```

Cursor

**3.30h**

Press the Cursor Up or Cursor Down key to get the correct digits (00 through FF) in the first 2-character position (refer to the *IBM 5294 Setup Form*).

**3.30i**

Press the Cursor Right key to move to the next position in field B ->.

```
1-> 00    2-> 01    4-> 027    A-> AAAAAAAAAAAAAAA    B-> 00 0 0
```

Cursor

**3.30j**

Press the Cursor Up or Cursor Down key to get the correct digit (0 through F) in the first position (refer to the *IBM 5294 Setup Form*).

**3.30k**

Press the Cursor Right key to move to the next position in field B ->.

```
1-> 00    2-> 01    4-> 027    A-> AAAAAAAAAAAAAAA    B-> 00 0 0
```

Cursor

**3.30l**

Press the Cursor Up or Cursor Down key to get the correct digit (0 or 1) in the first position (refer to the *IBM 5294 Setup Form*).

Go to step **3.31**.

**3.31**

**Do *all* the fields on your display match the information on the *IBM 5294 Setup Form?***

**YES** → **3.32**

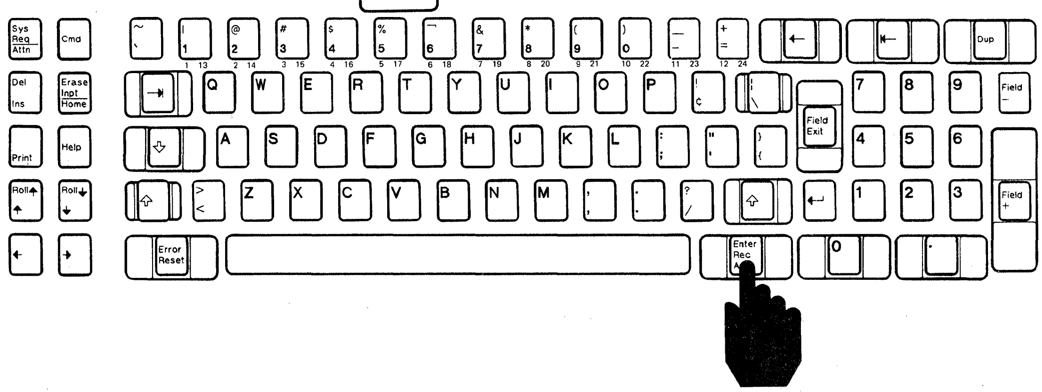
**NO** → Place the cursor under the incorrect field(s) and enter the matching information.

Then go to step **3.32**.

If an error code appears in the lower left corner of your display, refer to the *Customer Setup Error Codes* in Appendix B for an explanation and recovery procedure.

**3.32**

**Press the Enter key TWICE to store the information.**




**Go to step 3.33.**

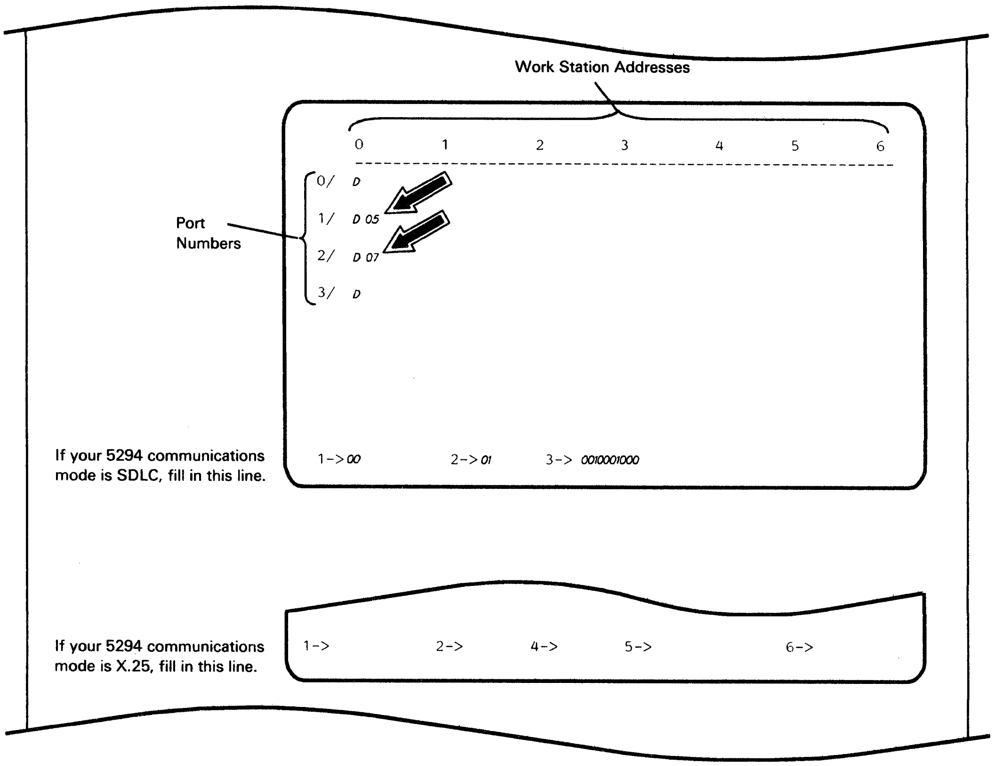
The work station layout display on the *IBM 5294 Setup Form* may have a two-digit code beside some or all of the letter Ds on the display.

These additional codes are keyboard codes. They assign a particular language keyboard to a display station keyboard.

You should enter these codes on your display one at a time.

**3.33**

You have now completed the entry field information. However, there may be additional information on the *IBM 5294 Setup Form* to be filled in on the display (see example below).




**Is there additional information to be filled in on your display?**

YES → 3.34

NO → 4.1

# Setting the Keyboard Codes

Perform the following procedure for each keyboard code on the *IBM 5294 Setup Form* layout display.

**3.34**

**Press the Cursor Left or Cursor Right key to move the cursor under the second position of field 1 ->.**

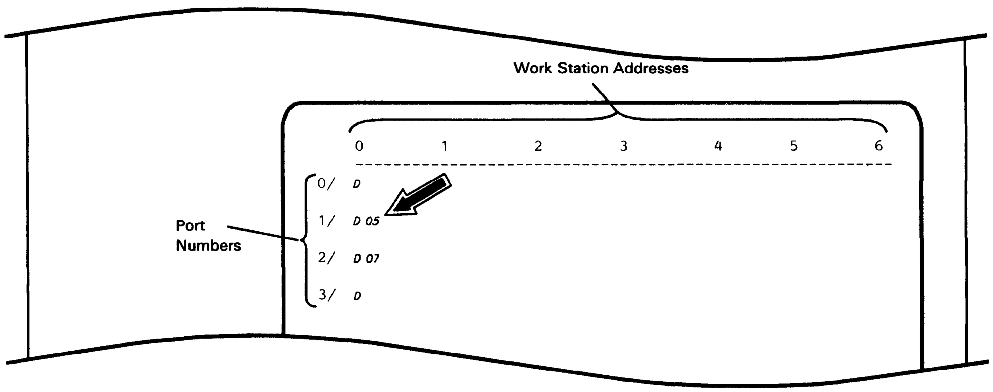
```
1-> 00     2-> 01     3-> 0010001000
```

Cursor

The procedure in this section does not change the information that you entered and stored in the last section.

**3.35**

**Locate the first D on the *IBM 5294 Setup Form* that has a two-digit code beside it.**




**Press the Cursor Up or Cursor Down key to increase or decrease the value in field 1 -> until it is the same as the code beside the first D on the setup form.**

```
1-> 05 - -     2-> 01     3-> 0010001000
```

When there is a valid keyboard code in field 1->, two dashes appear beside that code.

**3.36**

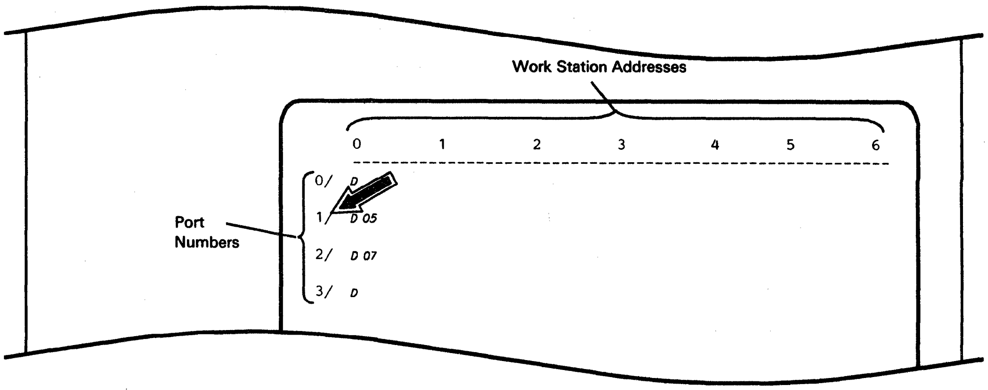
**Press the Cursor Right key to move the cursor under the first dash next to field 1 ->.**

```
1-> 05 - -     2-> 01     3-> 0010001000
```

Cursor

**3.37**

**Find the port number (row number) of the first D (display station) with a two-digit code on the *IBM 5294 Setup Form.***




**Press the Cursor Up key until the port number appears in the position of the first dash.**

```
1-> 05 1 -     2-> 01     3-> 0010001000
```

**3.38**

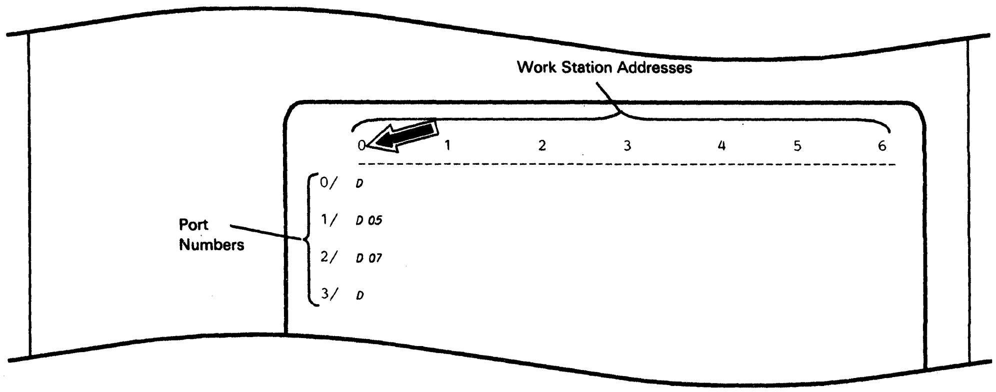
**Press the Cursor Right key to move the cursor under the second dash.**

```
1-> 05 1 -     2-> 01     3-> 0010001000
```

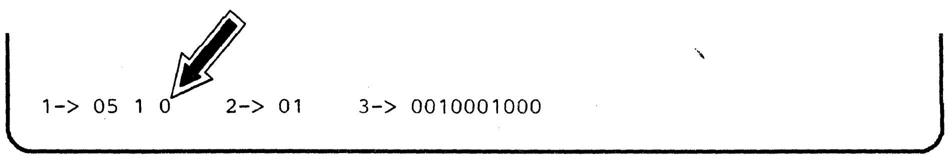
Cursor

**3.39**

**Locate the address (column number) of the first D (display station) with a two-digit code on the *IBM 5294 Setup Form.***

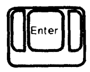



**Press the Cursor Up key until the address appears in the position of the second dash.**



After you press the Enter key, the code that you entered in the previous section of this manual appears in field 1->. The code you just entered should appear beside the D on your display.

**3.40**

**Press the Enter** 

**key.**

**Does the two-digit code that you just entered appear beside the correct D on your display?**

**YES** → Press the Enter key again to store the information. Repeat steps 3.34 through 3.40 for each keyboard code on the *IBM 5294 Setup Form.* When all codes are entered, continue to Chapter 4.

**NO** → If the two-digit code does not appear, press the Reset key and repeat steps 3.34 through 3.40. If the code still does not appear, contact the person who planned the setup and report the problem.

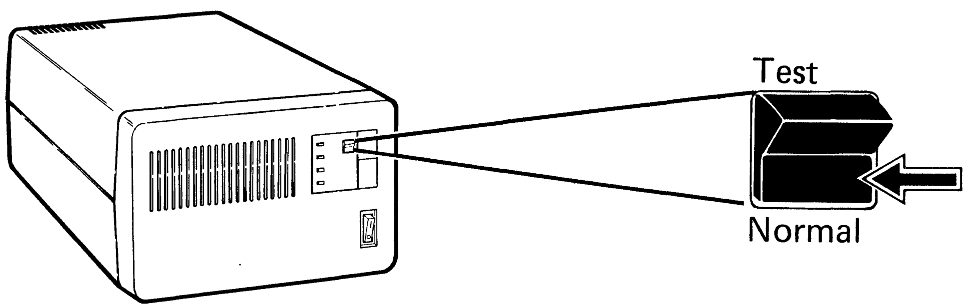
If an error code appears in the lower left corner of your display, refer to the *Customer Setup Error Codes* in Appendix B for an explanation and recovery procedure.

# Chapter 4. Communications Line Connection

**4.1** **Go to the 5294 Control Unit.**

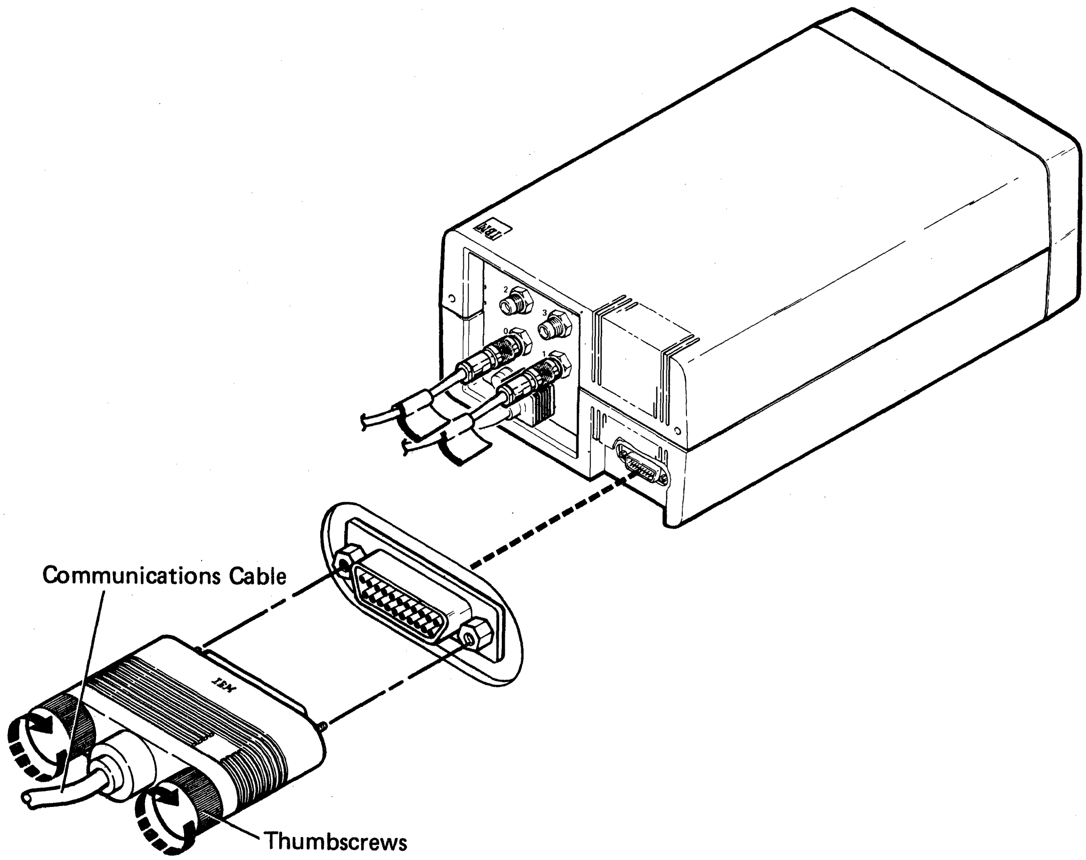
**4.2** **Set the Power switch to Off.**

**4.3** **Set the Test/Normal switch to Normal.**



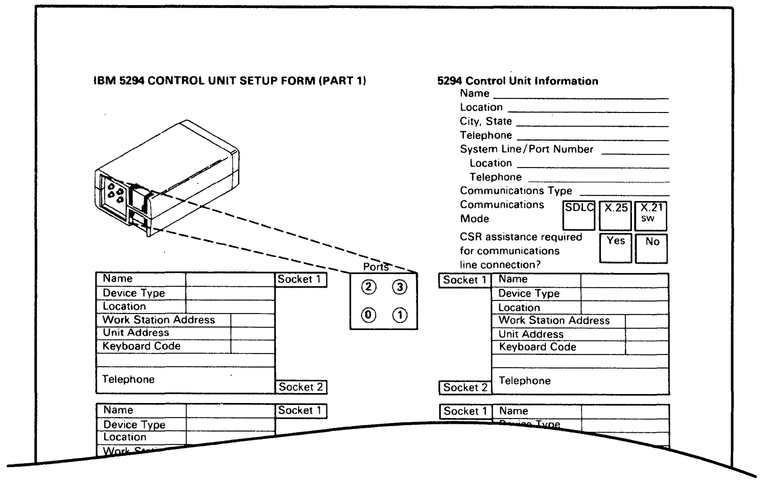
**4.4**

**Plug the communications cable into the 5294 Control Unit and turn the thumbscrews clockwise until tight.**



## 4.5

**Determine the type of communications your system has. Refer to part 1 of the *IBM 5294 Setup Form* (Appendix A).**




## 4.6

**Find your type of communications in the list below and go to the step indicated.**

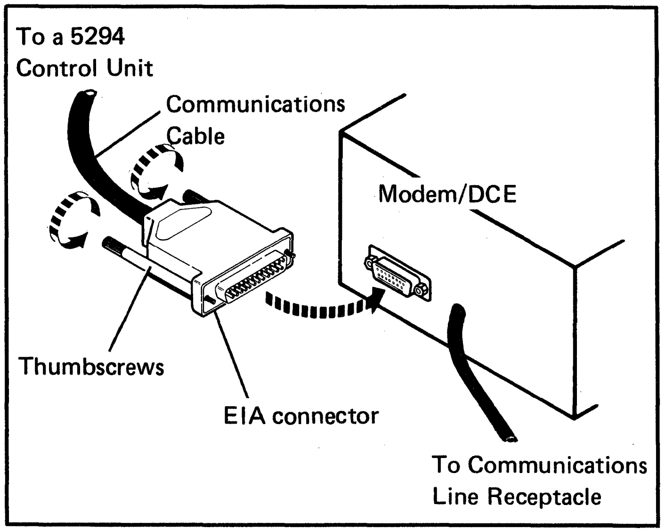
- EIA or CCITT Interface, go to step **4.7** .
- X.21 Signal Converter or DDSA, go to step **4.8** .

## 4.7 EIA or CCITT Interface

If you are connecting your work station controller to a modem/DCE and it is not yet connected, push the connector into the receptacle on the modem/DCE and turn the thumbscrews clockwise until tight.

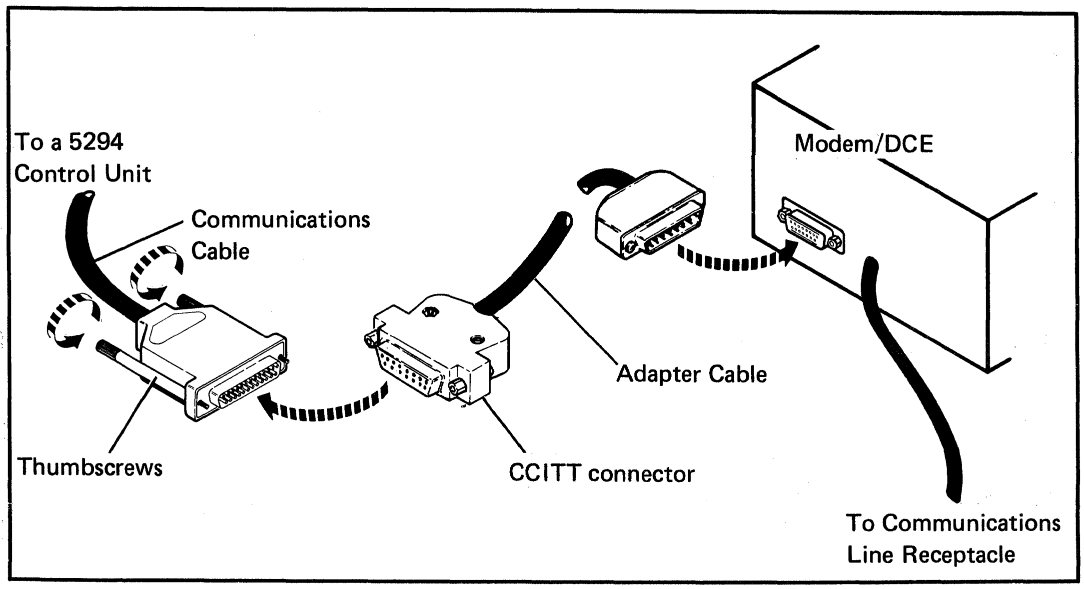
Go to step 4.9 .

**Without adapter cable (EIA)**




**OR**

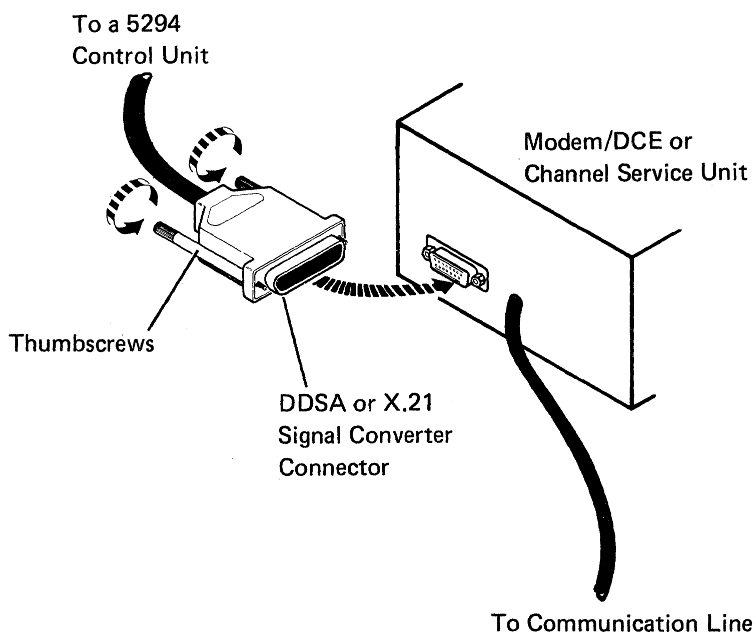
**With adapter cable (CCITT)**



4.8

## X.21 Signal Converter or Digital Data Service Adapter (DDSA)

If you are connecting the work station controller to a modem/DCE or a channel service unit that is not yet connected, push the connector into the receptacle and turn the thumbscrews clockwise until tight. Go to step 4.9.



**4.9**

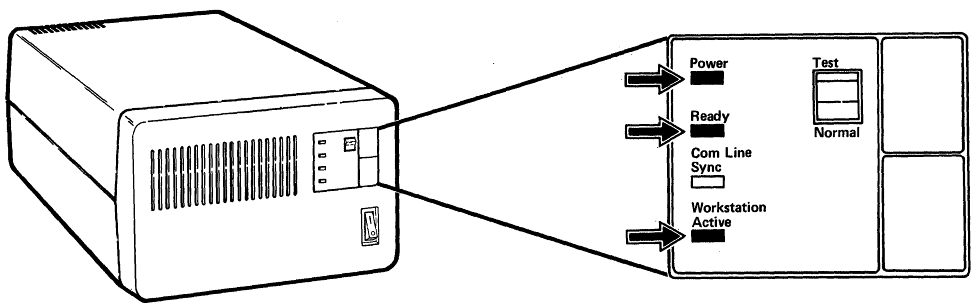
**If you are connecting your 5294 to a modem/DCE, make sure the modem/DCE is powered on (plugged in and turned on).**

**4.10**

**Set the 5294 Power switch to On.**

**4.11**

The Power indicator comes on immediately, followed by the Ready and Workstation Active indicators.




**Do the indicators come on?**

**YES** → **4.12**

**NO** → If the Power, Ready, and Workstation Active indicators are not on, make sure all the cable connections are secure. If the indicators are still not on, contact your service representative.

**4.12** **Contact your system operator and report that you have completed setup of the 5294 Control Unit and are ready to establish communications with the system.**

**4.13** **Setup is complete.**

**4.14** For information on how to establish communications between the 5294 and a host system, see Chapter 2 in the *IBM 5294 Operator's Guide.*

Save this manual and the completed *IBM 5294 Setup Form*. They will be needed when additional work stations are attached or if the 5294 is relocated.

# Appendix A. IBM 5294 Setup Form

This form should be completed by the planner before you set up the IBM 5294 Control Unit. For more information see the *IBM 5250 Information Display System Planning and Site Preparation Guide*, GA21-9337.

## IBM 5294 CONTROL UNIT SETUP FORM (PART 1)

**5294 Control Unit Information**

Name ____________________

Location ____________________

City, State ____________________

Telephone ____________________

System Line/Port Number __________

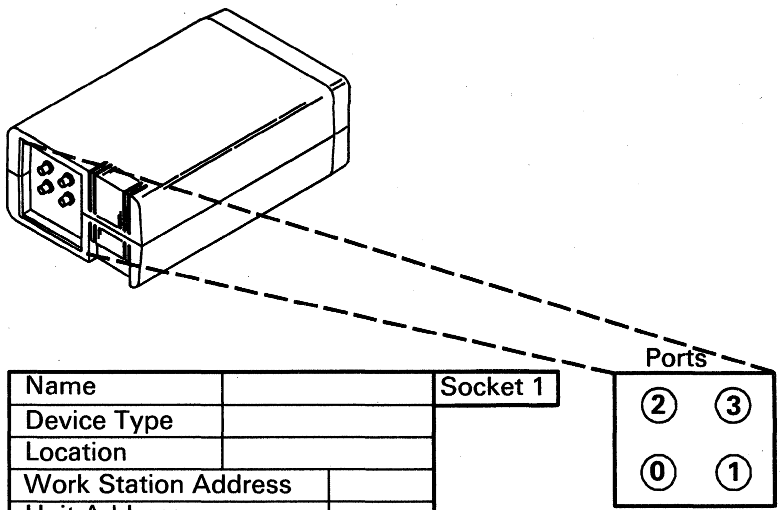
Location ____________________

Telephone ____________________

Communications Type __________

Communications Mode: SDLC ☐ X.25 ☐ X.21 SW ☐

CSR assistance required for communications line connection? Yes ☐ No ☐




Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

Socket 1

| | |
|---|---|
| Name | |
| Device Type | |
| Location | |
| Work Station Address | |
| Unit Address | |
| Keyboard Code | |
| | |
| Telephone | |

Socket 2

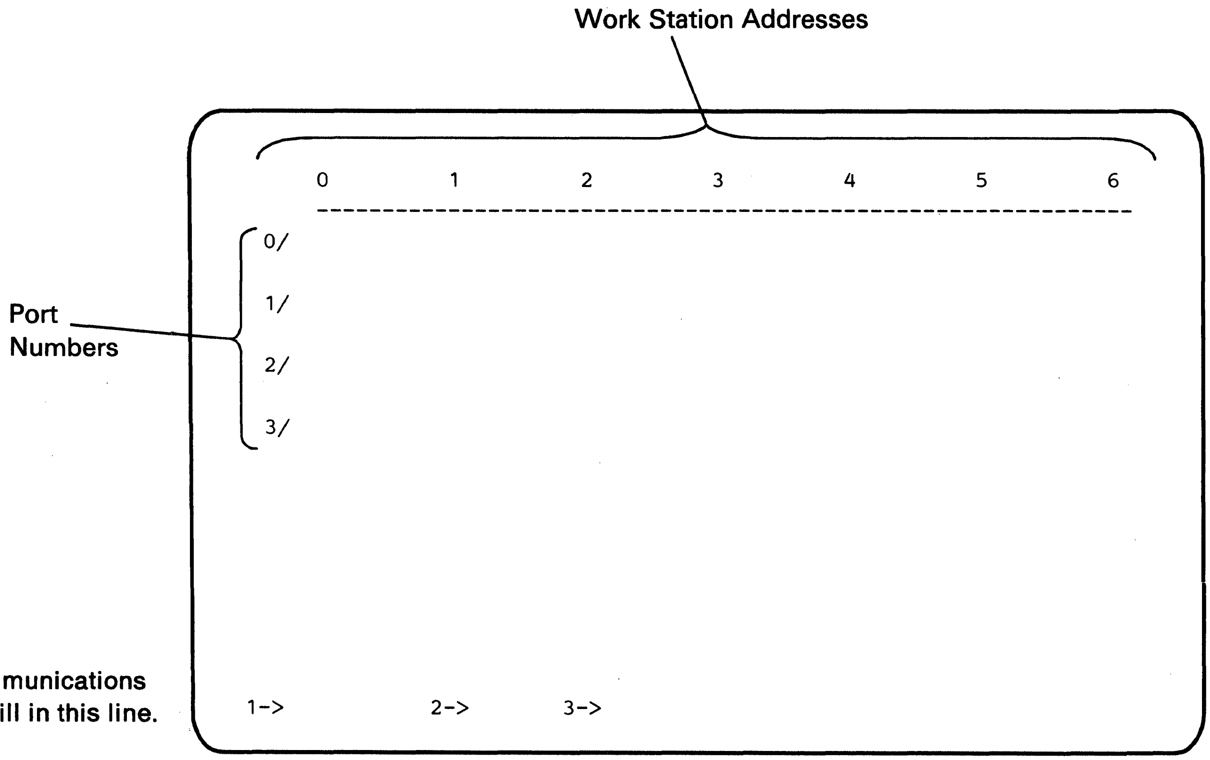
**Note:** Each cable connected to a 5294 port should have a tag with a number from 0 through 3. There should be a cable for each port used. Connect each cable to the port indicated on its tag.

# IBM 5294 Control Unit Setup Form (Part 2)

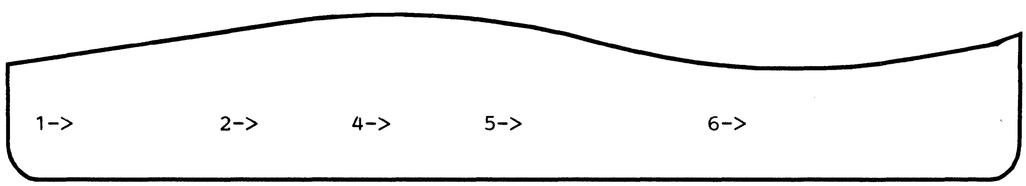
During 5294 setup, you need to enter the information on this form in the entry fields on the appropriate line at the bottom of your display. Also, if a number is beside a D or P on the top part of the form it must be entered.

**Note:** On the top of each display are the possible work station addresses (0, 1, 2, 3, 4, 5, or 6). On the left side of each display are the port numbers (0/, 1/, 2/, or 3/). Port numbers 2/ and 3/ appear only only when the 5294 has four ports.

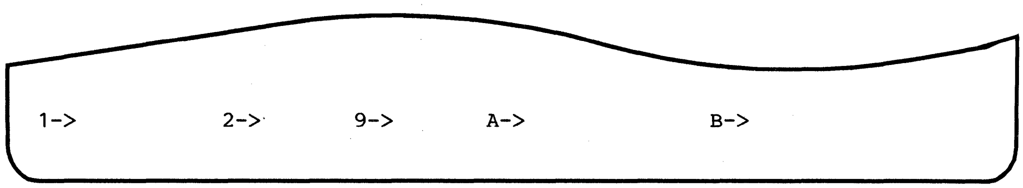
If your 5294 communications mode is SDLC, fill in this line.



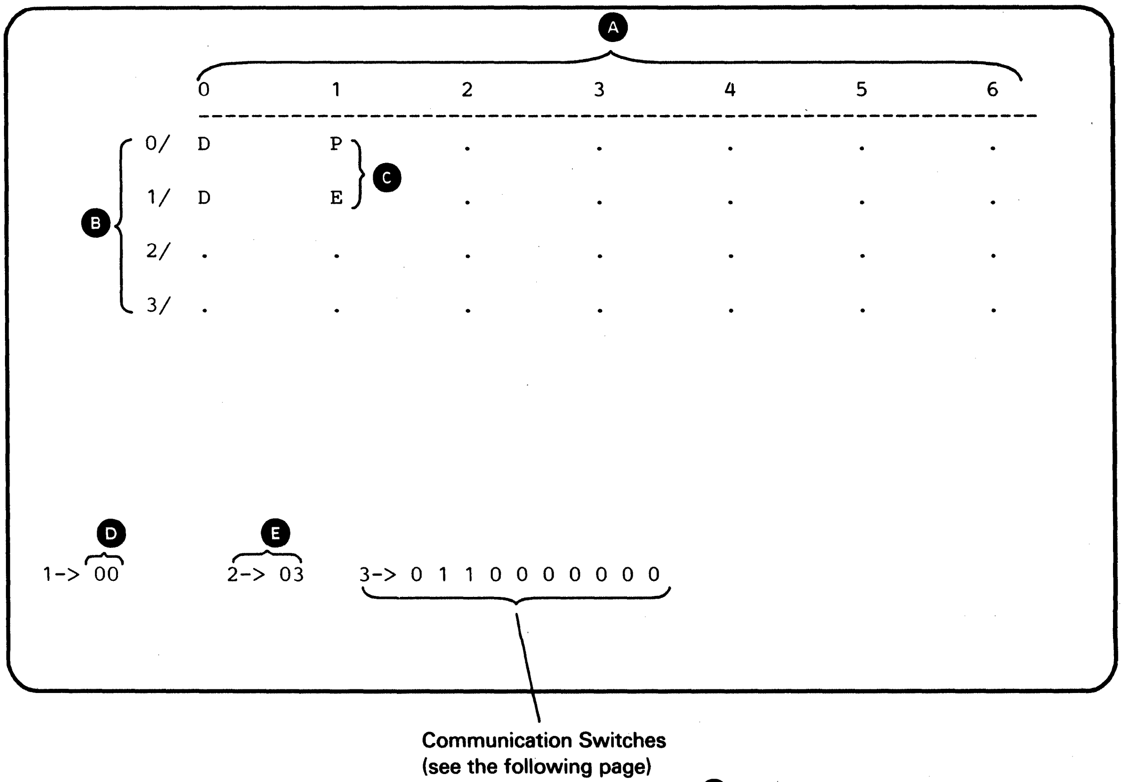

If your 5294 communications mode is X.25, fill in this line.




If your 5294 communications mode is X.21 switched, fill in this line.



# Typical SDLC Configuration Screen




**A** Work Station Address (for attached work stations).

**B** Work Station Controller Port Number.
Ports 2 and 3 will be present for 4-port machines only.

**C** Attached Work Station Information

D = Display Station
P = Printer
E = Error. More work stations were found than permitted for this machine.

**D** Keyboard Language ID.
See the language ID codes[1] listed on page 55.

**E** Work Station Controller SDLC Station Address.
Range is 01 through FE.

---

1 Always 00 for US/Canada standard and cannot be changed. It may be changed for World Trade (multinational) machines only.

**Communication Configuration (Default is 0)**

```
3->0 0 0 0 0 0 0 0 0 0
```

Bits, right to left:

**Modem/DCE Status**

- 1 Test Indicate Supported
- 1 Remote Loopback Supported
- 1 Local Loopback Supported
- 1 IBM LPDA Modem Attached: (386X, 383X, 586X)
- 1 Leading Pad Needed

**SDLC Options**

- 0 DTR, 1 CDSTL
- 0 NRZI, 1 NRZ
- 0 Multipoint, 1 Point-to-Point
- 0 Half Duplex, 1 Duplex
- 0 Non-Switched, 1 Switched

Work stations are automatically entered into the configuration by the work station controller. The work station controller senses which work stations are powered on and are in the ready condition. Only those work stations that are in the ready condition are displayed on the configuration screen. Before entering a configuration, which you will be asked to do later on in this procedure, always ensure that the displayed work stations match the configuration on the IBM 5294 Control Unit Setup Form.

The only keys permitted during configuration are the cursor up and down and cursor right and left movement keys. The cursor up and down movement keys are used to change the values in a field. The cursor right and left movement keys are used to move the cursor to the desired field.

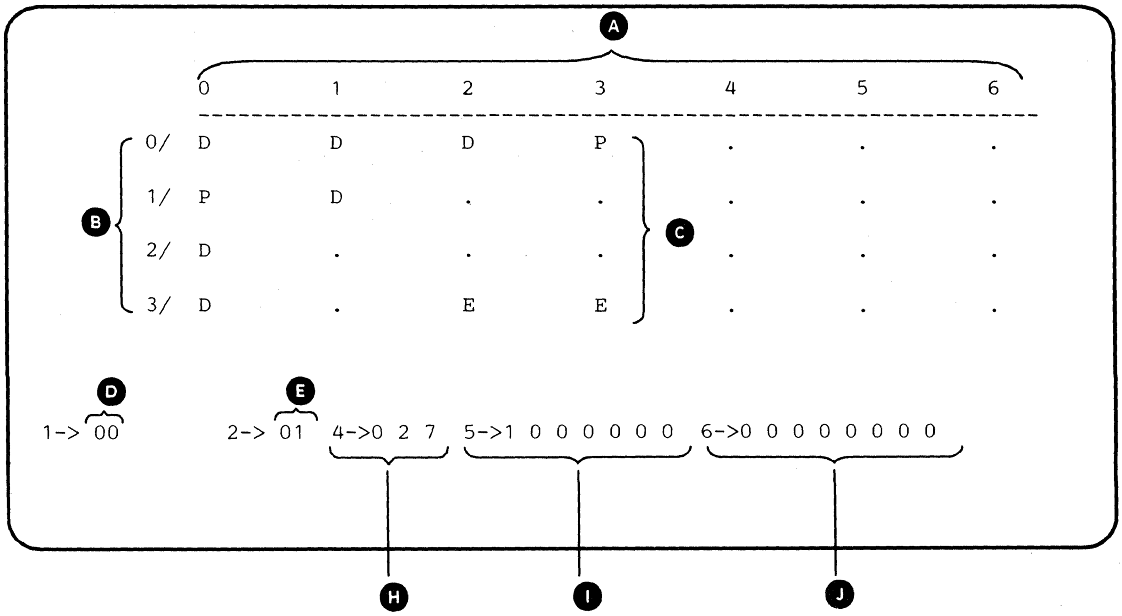
When the configuration screen is first displayed, the cursor will be located in field 1.

1. Enter the language ID in field 1. Skip this step for US/Canada (English). See page 55 for a list of the language IDs and entry procedure.
2. Move the cursor to field 2.
3. Enter the work station controller address.
4. Move to field 3.
5. Enter the communication switch configuration. See the IBM 5294 Control Unit Setup Form or ask the customer for this information.
6. If your display station is a 5251, 5291, 5292, or 5551, press the Cmd and cursor right movement keys.
7. If your display station is a 3179, a 3180, or a 3196, press and hold the Alt key and press the cursor right movement key.

   If your keyboard is different from the keyboards in steps 6 and 7, refer to Chapter 3, Step 3.4.
8. Fields 7 and 8 should now appear.
9. Enter the communication card type in field 7.
10. Move the cursor to field 8.
11. Enter the serial number of the work station controller.
12. Press the Enter key **twice**.

    **Note:** If an error occurs after pressing the Enter key once in step 12, see the error code descriptions and take the necessary corrective action.

# Typical X.25 Configuration Screen




**A** Work Station Address (attached work stations).

**B** Work Station Controller Port Number.
Ports 2 and 3 will be present for 4-port machines only.

**C** Attached Work Station Information

D = Display station
P = Printer
E = Error. More work stations were found than permitted for this machine.

**D** Keyboard Language ID.
See the language ID codes[2] listed at 0460.3.

**E** Work Station Controller X.25 Station Address.
Range is 01 through FE.

**H** **(Field 4)**

0 2 7

- 7: Link Window Size (1 through 7 valid. Default = 7)
- 2: Packet Window Size (2 through 7 valid for Modulo 8; 2 through 9 valid for Modulo 128. Default=2)
- 0: 0 Modulo 8; 1 Modulo 128 (Default = 0)

**Note:** Fields 4, 5, and 6 are not displayed unless the X.25 feature is installed.

2 Always 00 for US/Canada standard and cannot be changed. It may be changed for World Trade (multinational) machines.

**I** **(Field 5)**

1 0 0 0 0 0 0 (Default = 0, unless shown differently)

- 1 Test Indicate Supported
- 1 Remote Loopback Supported
- 1 Local Loopback Supported
- 1 Manual Options Permitted
- 1 Flow Control Negotiation Permitted
- Virtual Circuit Type:
  - 0 SVC or both SVC and PVC
  - 1 PVC
- Packet size (bytes):
  - 0 64
  - 1 128 (default)
  - 2 256
  - 3 Reserved

**J** **(Field 6)**

0 0 0 0 0 0 0 0 (Default = 0)

- Reserved
- 0 Not DDX-P Network
  1 DDX-P Network (Japan)
- Link Initiation:
  - 0 Initiated by the work station controller or network
  - 1 Initiated by the network only (Italy ITAPAC; Belgium DCS; Singapore TELEPAC; or other Siemens[3] network)
- Special Network Attachment:
  - 0 None
  - 1 United Kingdom Switch Stream 1 or Telenet[4]
- LLC Selection:
  - 00 PSH
  - 01 QLLC
  - 10 ELLC
  - 11 Reserved
- Reverse charge:
  - 0 Do not accept
  - 1 Accept

**XXXX** Error Code

---

3 Siemens, a trademark of the Siemens Corp.

4 Telenet, a trademark of the Telenet Communications Corp.

# Procedure for Entering X.25 Configuration Data

Work stations are automatically entered into the configuration by the work station controller. The work station controller senses which work stations are powered on and are in the ready condition. Only those work stations that are in the ready condition are displayed on the configuration screen. Before entering a configuration, which you will be asked to do later on in this procedure, always ensure that the displayed work stations match the configuration on the IBM 5294 Control Unit Setup Form (0460.5).

The only keys permitted during configuration are the cursor up and down and cursor right and left movement keys. The cursor up and down movement keys are used to change the values in a field. The cursor right and left movement keys are used to move the cursor to the desired field.

When the configuration screen is first displayed, the cursor will be located in field 1.

1. Enter the language ID in field 1. Skip this step for US/Canada (English). See page 55 for a list of the language IDs and entry procedures.
2. Move the cursor to field 2.
3. Enter the work station controller address.
4. Move to field 3.
5. Enter the communication switch configuration. See the IBM 5294 Control Unit Setup Form or ask the customer for this information.
6. If your display station is a 5251, 5291, 5292, or 5551, press the Cmd and cursor right movement keys.
7. If your display station is a 3179, a 3180, or a 3196, press and hold the Alt key and press the cursor right movement key. If your keyboard is different from the keyboards in Steps 6 and 7, refer to Chapter 3, Step 3.4.
8. Fields 7 and 8 should now appear.
9. Enter the communication card type in field 7.
10. Move the cursor to field 8.
11. Enter the serial number of the work station controller.
12. Press the Enter key **twice**.

    **Note:** If an error occurs after pressing the Enter key once in step 12, see the error code descriptions and take the necessary corrective action.

# Language ID Code Description

```
            0        1        2        3        4        5        6
            -------------------------------------------------------------
      0/    D        .        .        .        .        P        .

      1/    D 05 ┐   .        .        .        .        .        .
                 } (C)
      2/    D 03 ┘   .        .        .        .        .        .

      3/    D        .        .        .        .        .        .

   (A)   (B)
 1-> 07  - -     2-> 01     3-> 0 1 1 0 0 0 0 0 0 0
```

**(A) For Model 1 machines only**

| | | | | | |
|---|---|---|---|---|---|
| 00 | US/Canada Standard | 10 | Italy | 20 | Brazil |
| 01 | Japan Katakana | 11 | Italy Universal | 21 | Brazil Universal |
| 02 | Japan English | 12 | United Kingdom | 22 | Austria/Germany |
| 03 | Japan Universal | 13 | United Kingdom Universal | 23 | Austria/Germany Universal |
| 04 | France Azerty | 14 | International | 24 | US/Canada Universal |
| 05 | France Azerty Universal | 15 | International Universal | 25 | Mixed Swiss/French |
| 06 | Belgium | 16 | Norway | 26 | Mixed Swiss/French Universal |
| 07 | Belgium Universal | 17 | Norway Universal | 27 | Mixed Swiss/Germany |
| 08 | Canada (French) | 18 | Portugal | 28 | Mixed Swiss/Germany Universal |
| 09 | Canada Universal | 19 | Portugal Universal | 29 | Swiss/French |
| 0A | Denmark | 1A | France Qwerty | 2A | Swiss/French Universal |
| 0B | Denmark Universal | 1B | France Qwerty Universal | 2B | Swiss/Germany |
| 0C | Finland | 1C | Spain | 2C | Swiss/Germany Universal |
| 0D | Finland Universal | 1D | Spain Universal | 2D | ASCII |
| 0E | Spanish Speaking | 1E | Sweden | 2E | ASCII Universal |
| 0F | Spanish Speaking Universal | 1F | Sweden Universal | | |

**(A) For Model K01 (ideographic) machines only**

| | | | |
|---|---|---|---|
| 00 | Kanji | 02 | Japanese English |
| 01 | Katakana | 03 | Japanese English (multinational) |

04 through 2A are not used

**(A) For Model S01 machines only**

00 all attached to S01

**Notes:**

1. Codes 25 through 28 are used with all Models of 5251, 5291, and 5292 with French or German keyboards and a mix of keyboards including a mix of 3179 Model 2, 3180 Model 2, and/or 3196 Swiss/French or Swiss/German keyboards with any of the keyboards coded 00 through 24.
2. Codes 29 through 2C are used with 5291, 3179 Model 2, 3180 Model 2, and/or 3196, with Swiss/French or Swiss/German keyboards.
3. When a 5551 is attached, the language ID code is read from the 5551 and used in place of the code in the configuration record.
4. Codes 20 and 21 are for Brazil, except when the Enhanced Keyboard feature is installed. Then, codes 20 and 21 are for the Netherlands.

**Entering Language ID Codes for Single and Multiple Language Sites**

The keyboard language ID code is entered in field 1 Ⓐ by using the cursor up or down movement keys to change the code to the desired value. When a Universal code is displayed, two dashes (--) Ⓑ will be shown. If all attached display stations use the same keyboard language ID, only one entry is needed, and the dashes can be ignored.

When using the Universal language ID codes, each display station keyboard language ID can be defined separately, permitting multiple languages to be used at one site.

**Entering Single Language ID Codes**

1. Enter into field 1 Ⓐ the language ID code used by the attached display stations. If a field of dashes (--) appear to the right of field 1 Ⓑ, ignore them. This field will be used at sites where the attached display stations have different language ID codes (see Entering Multiple Language ID Codes).
2. Enter the remainder of the configuration data.
3. Press Enter **twice**.

**Entering Multiple Language ID Codes**

To enter the language ID code for display stations having different language IDs, do the following:

1. Enter into field 1 Ⓐ the Universal language ID code (Model 1) or language ID code (Model K01) used by the largest number of attached display stations. No entry should be made in the field of dashes Ⓑ.
2. Press Enter **twice**.
3. Position the cursor back to field 1 Ⓐ.
4. Change field 1 to the Universal language ID code (Model 1) or language ID code (Model K01) of one of the display stations with a different language ID.
5. Move the cursor to the first dash (-) position in field 1 Ⓑ.
6. Enter the work station controller port number to which this display station is attached.
7. Move the cursor to the next dash (-) position in field 1.
8. Enter the work station address of this display station.
9. Press Enter **twice**.

   The keyboard language ID code will be displayed next to the D in field Ⓒ for the display station just changed.
10. Repeat steps 3 through 9 for each attached display station that has a language ID code different from the one entered in step 1.

# Communication Configuration Description

The descriptions for communication configuration differ for both SDLC and X.25.

**SDLC - Field 3**

The communication bits (switches) may be displayed on line 22 of the display screen of any attached display station. A definition for each bit follows:

```
0 0 0 0 0 0 0 0 0 0
|                 |
Bit 1             Bit 10
```

Nonswitched or Switched (Bit 1)

This bit indicates if a switched or nonswitched communication line is being used. When a switched line is used (1, on), the DTR (data terminal ready) line will drop in order to disconnect a call and is not turned on again until the DSR (data set ready) line is turned off.

Half-Duplex or Full-Duplex (Bit 2)

This bit sets the work station controller for the type of communication facility (line) used. When set for full-duplex (1, on), a continuous CTS (clear to send) signal is permitted, and the RTS (request to send) signal is always on, if bit 3 is set to point-to-point.

Multipoint or Point-to-Point (Bit 3)

This bit is set to indicate that the work station controller is connected to a multipoint or to a point-to-point communication line to the host system. The setting is off (0) for multipoint or on (1) for point-to-point.

NRZI or NRZ (Bit 4)

This bit selects either NRZI (non-return to zero inverted) or NRZ (non-return to zero) SDLC transmission coding options. These options are used to keep the loss of synchronization between the modems to a minimum. All stations communicating with each other on a network must use the same coding option.

The initial setting of this bit is recommended to be NRZI (0, off) for the EIA interface with analog modems/DCEs and NRZ (1, on) for DDSA, XLCA, and EIA interfaces, when EIA is used with digital DCEs.

DTR or CDSTL (Bit 5)

This bit controls the protocol used between the work station controller and the modem to prepare or answer a call.

0 = off, DTR (data terminal ready). Most modems/DCEs permit the DTR line to be on if the DSR (data set ready) line is off.

1 = on, CDSTL (connect data set to line). The modem/DCE needs the CDSTL turned on when:

- The work station controller takes control of the line to make a call, or
- The work station controller responds to the RI (ring indicator) signal or DSR (data set ready) signal being on and answers a call.

Leading Pad Required (Bit 6)

This bit is set on to cause the work station controller to transmit a pad character before the leading flag of each frame of a sequence of one or more frames. The pad character is hexadecimal 00 and should be used with the NRZI mode for modems/DCEs that require a leading pad for synchronization.

IBM LPDA Modem Attached (Bit 7)

This bit is set on to indicate that an IBM LPDA modem (or a modem having the same functions) is attached. LPDA modems are: 386X and 383X.

Local Loopback (Bit 8)

This bit is set on to indicate that the attached DCE will enter local loopback mode when the Test Control 1 line is active.

Remote Loopback (Bit 9)

This bit is set on to indicate that the attached DCE can cause the remote (host system) DCE to enter remote loopback mode when the Test Control 2 line is active.

Test Indicate (Bit 10)

This bit is set on to indicate that the attached DCE will turn on the Test Indicate line when the DCE is in the test mode.

**X.25 - Field 4**

Modulo 8

This bit defines the maximum number of packets that could be sent without an acknowledgment, as determined by the size of the Nr/Ns fields. The maximum number of packets is equal to the modulo number minus one.

Packet Window Size

This value defines the maximum number of packets that can be sent without an acknowledgment from the network. Valid values are 2 through 7. The value to be entered is specified by the network supplier.

Link Window Size

This value defines the maximum number of I-frames that can be sent from the controller without receiving an acknowledgment from the network. Valid values are 1 through 7.

**X.25 - Field 5**

Packet Size

This value sets the maximum number of bytes that the controller includes in a packet. This value includes all bytes except the packet header bytes.

Virtual Circuit Type

This bit defines the type of virtual circuit used. A PVC (permanent virtual circuit) is the X.25 network equivalent of a nonswitched line. A SVC (switched virtual circuit) is the X.25 network equivalent of a switched line. A customer may use both a PVC and an SVC on the same machine but not at the same time.

Flow Control

This bit is set on if the network is providing flow control negotiation for this controller. Flow control negotiation allows packet size and packet window size to be changed at the time a call is placed when using SVC. The manual options allowed bit must also be on.

Manual Options Allowed

This bit must be set on to allow operator entry of all keyboard entered options except network address, logical channel ID, and password.

If this bit is on and the customer has only one PVC subscription, the connection is established without operator action as soon as the controller is powered on and diagnostics completed. The virtual circuit type must be set to indicate PVC only.

The following bits apply only to controllers attached to an X.25 network via an X.21 bis interface (EIA/ECITT communication card used in the controller).

Local Loopback Supported
Remote Loopback Supported
Test Indicate Supported

These bits must be set to correspond to the information received from the network supplier.

**X.25 - Field 6**

Reverse Charge

When this bit is set on, if the customer is using an SVC with the answer option and the reverse charging facility is included in the customers subscription, incoming calls with reversed charging will be accepted.

LLC Selection

This value determines the type of LLC (logical link control) that will be used by the controller.

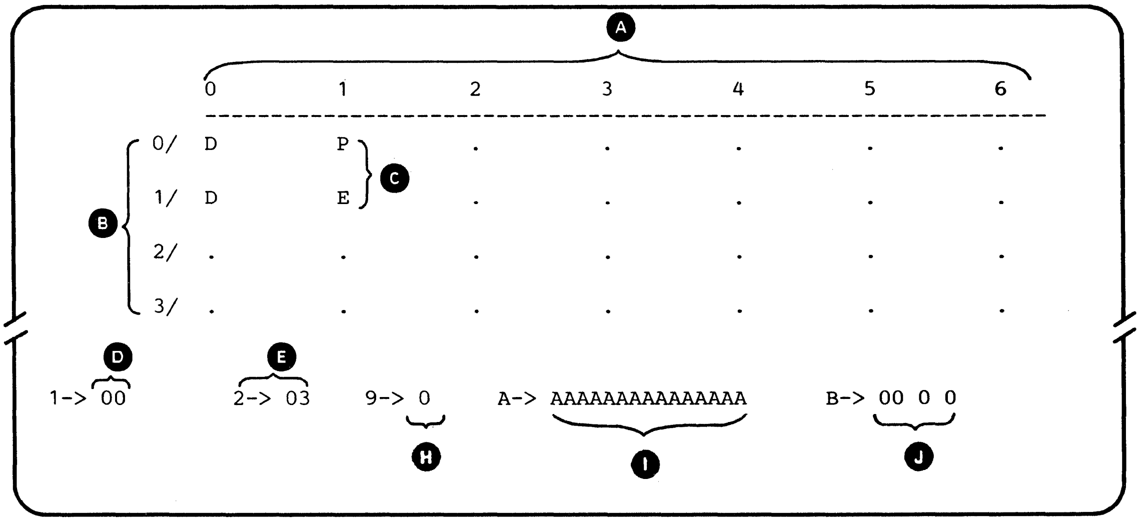
Special Network Attachment

This bit sets up the controller to operate on the UK PSS X.25 network or any other X.25 network using Telenet type operation.

Link Initiation

This bit is set on when attaching to networks that require link initiation to be done by the network only.

# Typical X.21 Switched Configuration Screen




**A** Work Station Address (for attached work stations).

**B** Work Station Controller Port Number.
Ports 2 and 3 will be present for 4-port machines only.

**C** Attached Work Station Information

D = Display Station
P = Printer
E = Error. More work stations were found than permitted for this machine.

**D** Keyboard Language ID.
See the language ID codes[5] listed on page 55.

**E** Work Station Controller SDLC Station Address.
Range is 01 through FE.

**H** 0 = Not Japan network
1 = Japan network

(X.21 State 17 bypass is allowed, and SI delineated call progress signals are recognized.)

**I** Telephone number assigned by network or RPOA

**J** 00 0 0

- Direct call (last digit)
  0 = XID dial digits Reconnect
  1 = Direct dial recon call
- Time delay (middle digit)
  X'0' - X'F'
  0 - 15 seconds
- Number of retries (first two digits)
  X'00' - X'FF'
  0 - 255 retries

**Note:** Fields 9, A, and B are not displayed unless the X.21 feature is installed.

5 Always 00 for US/Canada standard and cannot be changed. It may be changed for World Trade (multinational) machines only.

# Appendix B. Problem Checklist and Setup Error Codes

## Problem Checklist

If the Ds and Ps on your display do not match the information that is filled in on the *IBM 5294 Setup Form*, perform the following checks:

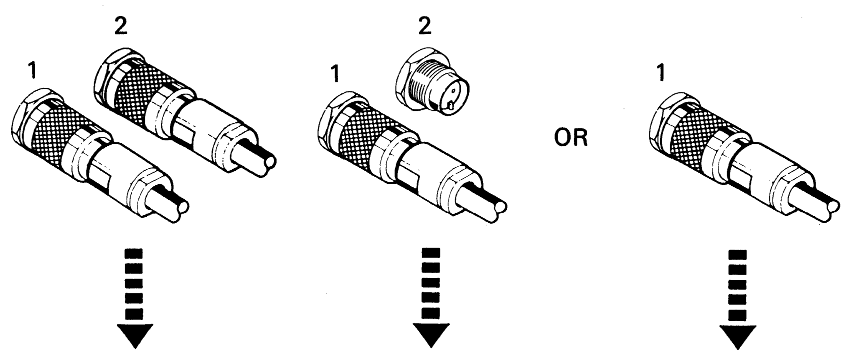
1. Make sure all the attaching display stations and printers are set up.

2. Make sure the Power switch on each attaching display station and printer is set to On.

3. Make sure *all* the cables connecting to the ports on the 5294 are connected and are securely fastened. Also make sure the cables are securely fastened at the other end.

4. Make sure the work station address of each work station is set correctly. If you are unsure of any work station address, contact your planner.

5. Check the Terminator switch on any work station that has one. Make sure it is set correctly. (Refer to Appendix C for the location of the Terminator switches.)




If two cables are connected, set the Terminator switch to 2.

If one cable is connected, set the Terminator switch to 1.

Display stations and printers with only one socket do not have Terminator switches.

6. After you have checked all of the above, repeat Steps 3.1 through 3.7 in Chapter 3.

If your display still does not match the layout display, contact your planner and report the problem.

# Customer Setup Error Codes

If a blinking four-digit error code appears in the lower left corner of your display during the setup procedure, refer to the following chart for an explanation and recovery procedure.

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0080** | The information you just entered in the entry fields has been somehow altered and must be entered again.<br><br>To recover, set the Power switch on the 5294 to Off and repeat 2.12 through 3.31. |
| **0081** | There are more than the maximum number of work stations attached to your 5294 Control Unit. (An E should appear on your display for every extra display station attached.)<br><br>To recover, disconnect the extra work stations. Contact your planner for assistance. |
| **0082** | The keyboard code you just entered is not valid for your configuration.<br><br>To recover, make sure the information on your display matches the information that is filled in on the *IBM 5294 Setup Form*. If it matches, contact your planner and report an invalid keyboard code. |
| **0083** | You tried to enter a keyboard code for a printer or at a location where no display station exists. (You can enter keyboard codes only beside Ds on the display.)<br><br>To recover, make sure you have the correct address and port number of the display station and enter the keyboard code again. |
| **0084** | Contact your IBM service representative to recover from this error. |
| **0086** | You tried to use the magnetic stripe reader or the selector light pen at your display station but the Expanded Function feature that supports those devices either is not installed in the 5294 or is not working.<br><br>To recover, make sure the Expanded Function feature was ordered and installed in the 5294.<br><br>If you are sure the feature was ordered and installed, contact your IBM service representative.<br><br>If it was not ordered and installed but should have been, contact your IBM sales representative. |

**0087** You entered invalid information in field 5-> on the status line.

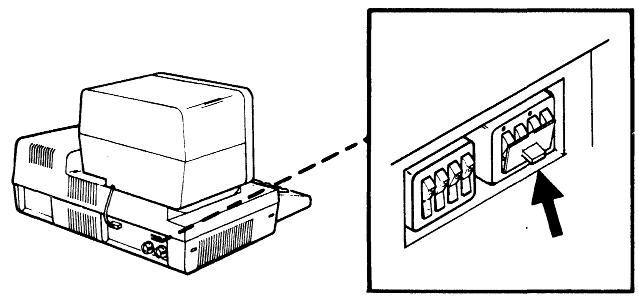
To recover, make sure that the positions in field 5-> were entered exactly as they appear on the *IBM 5294 Setup Form*. If they were, contact your planner and report an invalid combination for field 5->.

# Appendix C. Location of the Terminator Switches

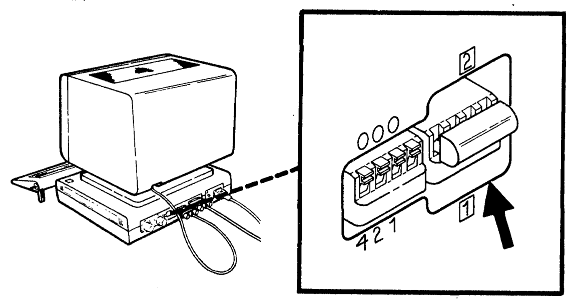
The following illustrations show the location of the Terminator switch on the display stations.

**Note:** Some work stations do not have a Terminator switch.

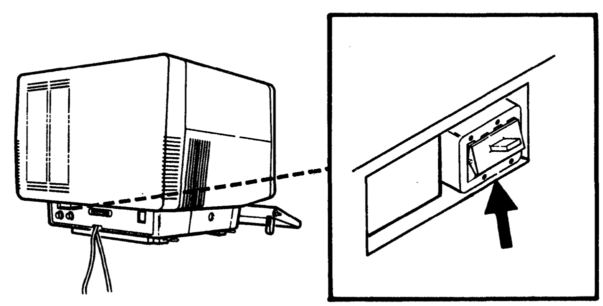
**5291 (Model 1)**



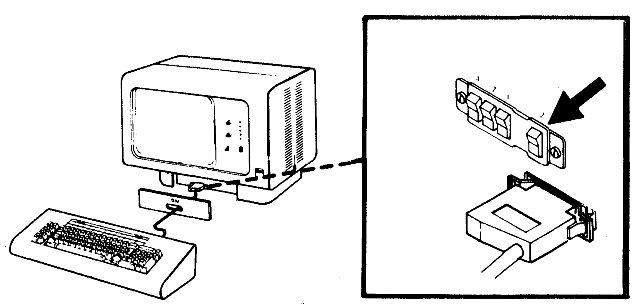
**5291 (Model 2)**



**5292 (Models 1 and 2)**

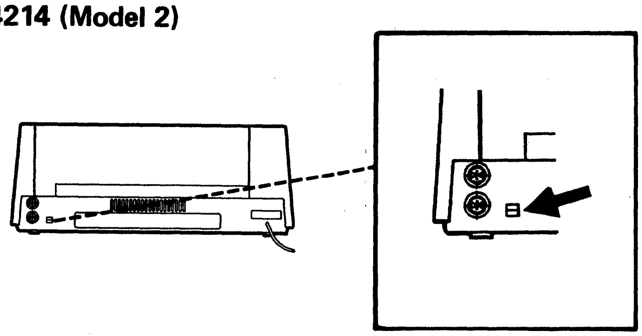


**5251 (Model 11)**

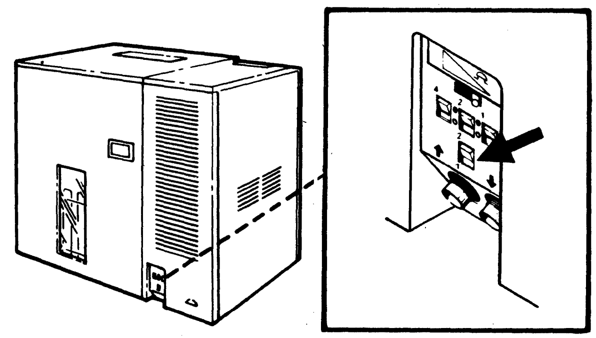


The following illustrations show the location of the Terminator switch on the printers.

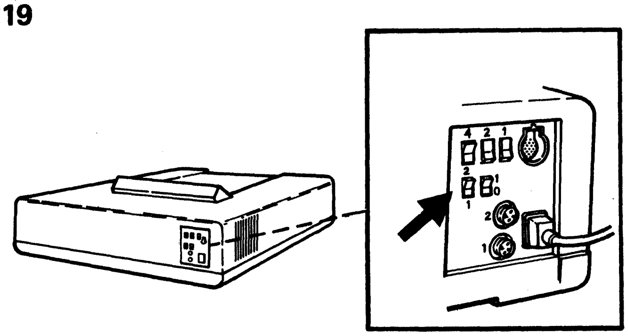
4214 (Model 2)



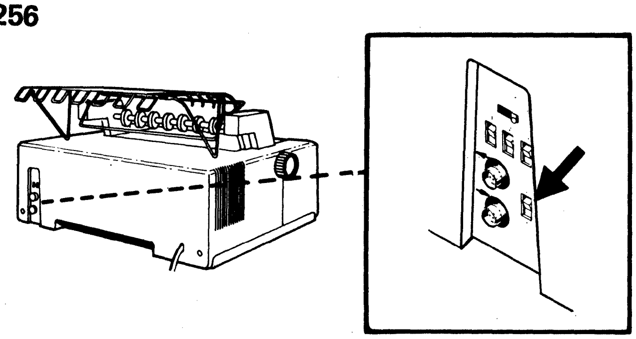
5225



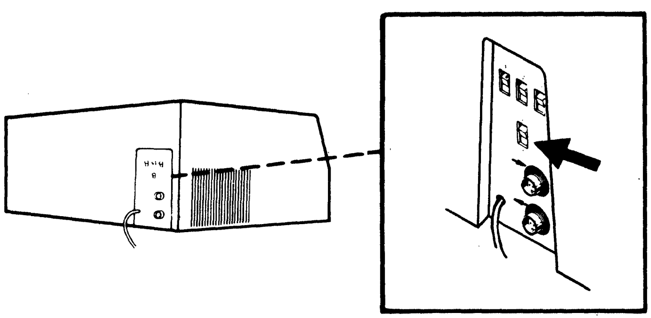
5219



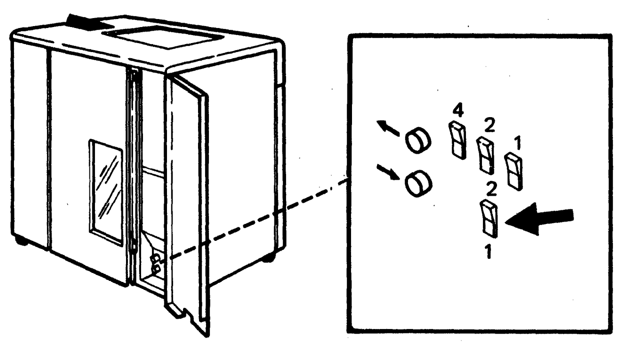
5256



5224



5262 (Model 1)



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